AGENDA: ANDERSEN CONSULTING

July 30, 1992

- Checkpoint on "yardstick"
  - Interview status
  - Data impressions: discontinuities
    - -- Aging of installed systems
    - -- Applications driven by functional units
    - -- New technology impact (cause/effect of above)
    - -- Importance (lack of) package tailoring
  - Selection of vendors and applications for tracking
- Review of "Best Bets" initial screening

Growth
ICP

- Review of "due diligence" assignment
- Small talk
- Discussion of "conjoint analysis" proposal

INPUT

July 10, 1992

To: Tom Moldauer, Andersen

Fm: Tom O'Flaherty, INPUT via fax

1. Questionnaire

Attached is a draft of the questionnaire. It hasn't been made totally pretty yet, but it's readable. In my absence, please send any comments to the attention of Joanne Ponnwitz who will be coordinating the questionnaire side of things. (She's on the same number as me.)

My notes on the question of the interview targets showed that we were in agreement that food/packaged goods was a good area and we were going to think more about the second group. There was some discussion as to whether we should include a service-oriented group. I think it might be interesting to have the second group be property/casualty insurance companies: In the 1980s one vendor achieved dominance (PMS), but there are signs that their position is not as strong as it used to be.

As I told you, we don't have to make a decision on the second group until the end of next week (July 17).

2. Best Bet List

You encouraged us to expand the list of verticals. In our discussion in Atlanta we also agreed that there were some manufacturing sectors that might not be that attractive (e.g., aerospace); in some other sectors (e.g., textile, paper), a quick perusal of company size distribution makes me wonder whether there is enough critical mass. Putting these factors together results in the following list of verticals for applying the initial screen to:

<u>From Original List</u>

Fabricated products
Electronics and appliances
Food/packaged goods
Chemicals
Pharmaceuticals
Wholesale distribution
Food retail
Other retail

<u>Proposed Vertical Market Additions</u>

Life insurance
Property/Casualty insurance
Health insurance
Health benefits administration (managed care)
Health care
Retail banking
Wholesale banking
Money management

This produces a wider, more diversified list, but isn't one that is too broad. By covering more of the major vertical groups we can also do a better job at assessing horizontal applications.

Please give me your comments in a few days. In my absence, please address these to John McGann (also at the same number), who will be involved in this part of the project.

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PRELIMINARY

MISSION CRITICAL APPLICATIONS STUDY

My name is _____. I'm with INPUT, a research and consulting firm in Teaneck, New Jersey. We are conducting a study on why companies replace their mission-critical applications. All the information you provide will be kept confidential, as well as your name and your company's name. In return for your assistance, we will send you a summary of the completed srudy at no charge.

1a. First of all, what are your five most important applications today? (in order of importance).

1b. How will this list change in five years, either in terms of their order on the list, or by the adding of new applications?

	1992	**1997**
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

1c. What are the reasons for these changes?

2. Next, I would like to understand more about four of these applications. **[Select as follows: If there were applications added to the 1997 list, take the top two additions, plus the two most important from 1992; if only one was added, take that, plus the top three for 1992; otherwise, the top four in 1992]**

Use one of the attached "Applications Sheets", for each application

INPUT
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TEANECK, NJ 07666

_____ **APPLICATION**

A. What is the source of this application?

In-house developed _____

Custom developed by a contractor _____

A commercial software package
(Name - _____)

Other (e.g., combination of above, developed by parent company) [describe]

B. Why was this source chosen?

C. What year was it installed?

D. What was the time to implement? (From completion of requirements to successful use?)

E. Approximately how much were the implementation costs? (Including design, testing, installation, software licences, but excluding hardware)? [Can prompt with following]

Under $100,000	_____	$1-5 M	_____
$100K - 500K	_____	$5 - 10 M	_____
$500K - $1 M	_____	Over $10 M	_____

F. What were the three most important reasons for installing this application?

1. _____

2. _____

3. _____

G. On a scale of 1 to 5 (with 5 being highest), how well were initial expectations for this application met? _____

Why?

H. Since installation, when have there been significant changes to the application, why were they made, and about how much did they cost?

Change/Reason	Year	Cost
_____	_____	_____
_____	_____	_____
_____	_____	_____

I. If a software package is used, is it now under a maintenance contract?

Yes _____ No _____

Why?

J. Looking back in time, did this applicaton replace a similar application?

Yes _____ No _____ If yes,

What was the source?

What year was this prior application installed?

Why was the applicaton replaced?

K. Looking ahead, what significant changes, (including replacement), do you expect to make (and why), when do you expect to make them, and what do you expect the order of magnitude costs will be?

Change/Reason	Year	Cost
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. Now I would like to ask some more general questions.

   A. Are changes occurring at a different rate now, compared to say, five years ago? (e.g., percent change,reasons)

   B. What is the role of end users in producing changes to applications now as opposed to five years ago?

   C. What impact do you see technology having on producing change in applications? (e.g., which ones, on which applications, how important, when)

4. Do you have any other comments on mission-critical applications in your organization or generally?

SCHEDULE AND FEE FOR PROPOSALS

IDENTIFICATION OF FUTURE "BEST BET" APPLICATIONS SOFTWARE MARKETS

and

DEVELOPING A "YARDSTICK" TO MEASURE SOFTWARE PRODUCTION OPPORTUNITIES

Submitted to

ANDERSEN CONSULTING

June 25, 1992

Submitted by

INPUT

The Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, New Jersey 07666

201-801-0050
Fax: 201-801-0441

SCHEDULE

Week	Task
1	INPUT meets with Andersen in Chicago: review Andersen plans; review criteria. Develop questionnaire.
2	INPUT: interviews; collects data for market share and case studies. Prepares initial scan of market opportunities.
3	Work session in New Jersey on "best bets". INPUT analyzes yardstick information
4	INPUT completes analysis and and prepares presentation
5	Present results in Chicago
6	Prepare written report

FEES

INPUT's professional fee for the study will be $38,000.

One-half of INPUT's professional fee for the study is due and payable upon authorization of the study; the remainder at the time of the presentation of results.

Out-of-pocket expenses (telephone, production, and travel) are in addition to the professional fees and will be billed at cost. INPUT does not expect these to exceed $2,000.

INPUT can begin work on July 2. This proposal will remain valid for thirty days, unless extended in writing. Andersen Consulting can initiate the study by providing authorization in the blocks provided below.

AUTHORIZATION

To authorize the project as specified, please sign and return one copy of this proposal, along with the initial fee. Upon acceptance by INPUT, a countersigned copy of the proposal will be returned to Andersen Consulting.

AUTHORIZED BY:	ACCEPTED BY:
Andersen Consulting	**INPUT**
Name	Name
Title	Title
Date	Date

7. Nothing in this Agreement shall prohibit or limit either party's use of information (including, but not limited to, ideas, concepts, know-how, techniques, and methodologies) (i) previously known to it, (ii) independently developed by it, (iii) acquired by it from a third party which was not, to the Recipient's knowledge, under an obligation to the Disclosing Party not to disclose such information, or (iv) which is or becomes publicly available through no breach by the Recipient of this Agreement.

8. In the event either party receives a subpoena or other validly issued administrative or judicial process requesting Confidential Information of the other party, the Recipient shall promptly notify the Disclosing Party and tender to it the defense of such demand. Unless the demand shall have been timely limited, quashed or extended, the Recipient shall thereafter be entitled to comply with such demand to the extent permitted by law. If requested by the party to whom the defense has been tendered, the Recipient shall cooperate (at the expense of the requesting party) in the defense of a demand.

9. Nothing in this Agreement shall prohibit or restrict either party's right to develop, use, or market products or services similar to or competitive with those of the other party disclosed in the Confidential Information as long as it shall not thereby breach this Agreement. Each party acknowledges that the other may already possess or have developed products or services similar to or competitive with those of the other party disclosed in the Confidential Information.

10. Neither party may use the name of the other in connection with any advertising or publicity materials or activities without the prior written consent of the other party.

11. This Agreement shall become effective as of the date Confidential Information is first made available to the other hereunder.

Agreed and Accepted:

INPUT

By _____

Title Vice President

Date July 8 1992

Agreed and Accepted:

ANDERSEN CONSULTING

By Thomas N. Mawhinney

Date 7/8/92

0076n

ANDERSEN CONSULTING
ARTHUR ANDERSEN & CO, S.C.

MUTUAL NONDISCLOSURE AGREEMENT

During the course of discussions between Andersen Consulting ("Andersen") and INPUT ("INPUT") relating to and for the purpose of research on market for application software, each party may disclose to the other information it considers proprietary and confidential which (a) relates to product plans and strategies, and (b) has been identified in writing as confidential ("Confidential Information"). As used herein, the party disclosing Confidential Information is the "Disclosing Party" and the party receiving the Confidential Information is the "Recipient". In connection therewith, the parties agree as follows:

1. Confidential Information of the Disclosing Party may be used by the Recipient only in connection with the purpose identified above.

2. The Recipient will not, at any time, use the Confidential Information of the Disclosing Party in any fashion, form, or manner, except in furtherance of the purpose described above.

3. The parties agree to protect the confidentiality of each other's Confidential Information in the same manner they protect the confidentiality of their own proprietary and confidential information of like kind. Access to the Confidential Information shall be restricted to those of each party's personnel engaged in a use permitted hereby.

4. Confidential Information disclosed hereunder shall at all times remain the property of the Disclosing Party. No license under any trade secrets, copyrights, or other rights is granted by this Agreement or any disclosure of Confidential Information hereunder.

5. Confidential Information of the Disclosing Party may not be copied or reproduced by the Recipient without the Disclosing Party's prior written consent.

6. All Confidential Information made available hereunder, including copies thereof, shall be returned to the Disclosing Party upon the first to occur of (a) completion of the purpose referred to above or (b) request by the Disclosing Party.

ANDERSEN CONSULTING
ARTHUR ANDERSEN & CO., S.C.

69 West Washington Street
Chicago, Illinois 60602
(312) 580-0069

9/01/89 (#0102n)

Mr. Thomas O'Flaherty
INPUT
Atrium at Glenpointe
400 Frank W. Burr Blvd.
Teaneck, NJ 07666

Dear Tom:

Andersen Consulting hereby retains you to perform services in connection with research on markets for application software.

You understand that in the performance of your services you may have access to information or materials that are confidential and/or proprietary. You agree that you will not disclose to others any information learned by you, nor will you take with you any materials to which you have access, in performance of your services.

Any materials you develop in the course of performing services for Andersen Consulting will be considered works made for hire and owned exclusively by Andersen Consulting and you assign all ownership rights to such materials to Andersen Consulting.

Your signature below indicates that you understand and accept the above conditions to your retention by Andersen Consulting.

Very truly yours,

ANDERSEN CONSULTING

By Thomas W. Mollahan

CLS/0102n

Understood and Agreed:

July 8, 1992

ORDER/INVOICE/FULFILLMENT

Accts. ONLY

Inv. Comp.	By:	Date:	Client #	Order #	Inv. #	Multi-Invoicing of

CUSTOMER/INVOICE TO

ORIGINATOR (Signature) _____ DATE 7/9/92

Company Andersen Consulting
Name Mr./~~Mrs.~~ Thomas Moldauer
Position Director
Address 69 W Washington St
City Chicago
Province
Phone 312-507-8743

CA Tax Rate
CT Tax 8%
Salutation
State IL
Zip 60602
Country
Fax 312 507 2548
Tlx

APPROVALS
TOR
VP Sales/Res.
7/9/92
Date
Controller
Date

Special instructions for invoicing, progress billing, or delayed payments, etc.

ORDER

Contract Year Beg. _____
End _____

❑ New Order (N1) ❑ Prior Yr (N3)
❑ Renewal (N2) ❑ Cancel

Invoice Type ❑ Fulfillment Only ❑ W/Order (OR) ❑ Monthly (MO) ❑ Quarterly (QT) ❑ Pending

Employee # Sold by:		Employee # Commission to:	
TOR	100%		%
	%		%
	%		%

CLIENT AUTH.

INPUT Contract ☒ Letter ❑ Verbal ❑

PO# _____
Attach all authorizing documents to white (contract) copy.

SHIP TO

Company _____
Name Mr./Ms. Steve
Position _____
Address _____
City _____

Province _____
Salutation _____
State _____
Zip _____
Country _____
Phone _____

ITEM TYPE

- Subscription (SB)
- Custom (YC/ZC/KC)VC
- Multiclient (MC)
- Reports (RP)
- Copies (CP)
- Consult/Present (PR)
- Newsletter (NL)
- Reimbursed Costs (EX)
- Merger/Acq. (ME)
- Exec Overview (EO)
- Conf/Seminar (CN)

DETAIL

Indicate US, UK, FR, VA	Prod. ID/Year	Item Type Code	Item Description or Title	Quantity	Price	Shipped By	Date
US	YNSWR	YC	Identifying Best Bets & Yardsticks for Software Products		38,000		
			Expense		2,000		
					40,000		

Fulfillment to be completed in: ❑ Corporate ❑ London ❑ Virginia ❑ France ❑ Other _____

• White - Contract • Green - Fulfillment • Yellow - Invoice • Pink - Originator • Goldenrod - Sales Manager

M&S180 11/90

INPUT

AUTHORIZATION

To authorize the project as specified, please sign and return one copy of this proposal, along with the initial fee. Upon acceptance by INPUT, a countersigned copy of the proposal will be returned to Andersen Consulting.

AUTHORIZED BY:	ACCEPTED BY:
Andersen Consulting	**INPUT**
Thomas W. McLaughlin	[signature]
Name	Name
Director, Product Planning	Vice President
Title	Title
7/8/92	July 8 1992
Date	Date

MARKET RESEARCH ABSTRACT

PROJECT 1: Develop a Yardstick to Measure Application Software Opportunities

OBJECTIVE

Determine "profiles" or ranges of expected market performance for specific product/market scenarios. This research pertains specifically to mission critical, vertical application software solutions with software sales prices in excess of $100,000 sold to buyers with gross revenues of at least $100 million. All analysis must be on a global scale. All findings should be expressed in terms of ranges. US ok

SCENARIOS

Annual Purchase Rate Profiles

Out of the total population of potential buyers, what percent will replace (or buy anew) a specific application each year? Three scenarios should be considered:

- **Stimulated Market** - regulatory changes, significant technology changes, or significant business practice changes prompt major buying activity (e.g., Hospital buying in the U.S. during the mid 80's prompted by DRG Medicare reimbursement schedule)
- **Normal Mission Critical** - mission critical applications, with no major stimulation of market beyond normal, continuous technology advances (e.g., MRP systems)
- **New Application** - a market where packaged solutions have not previously existed, or where vertically focused packages are new for an industry (e.g., process industry manufacturing systems over the last 5 years)

Market Share Profiles

What is a reasonable target market share? Custom and in-house development must be considered competitors. Two scenarios should be considered:

- **Three Major Players** - normal market with several major players
- **Crowded Market** - many players with small market share

Market Entry Profiles

How fast can a new entry build up to target market share? Two scenarios should be considered:

- **Existing Company, New Application Area** - vendor has proven themselves in other applications
- **Existing Company, Next Generation of Current Application** - vendor already markets the application and is superseding the product line

POSSIBLE APPROACHES

- **Large Numbers** - look at a large cross-section of applications over a long period of time to get some ranges for each of these scenarios.
- **Specific Case Studies** - find three specific cases for each scenario (like the DRG example above), dissect what happened, and see if a pattern is there.

EXPECTED USE

We would use these profiles for reasonability checks against software investment business cases.

For a completely hypothetical example, let's say there is a proposal to invest in a Water Rationing application for the Local Municipality market. This is a new, mission critical application. There are other well funded vendors pursuing the same market. The vendor seeking investment has many products, but this is their first venture into this application.

- We could take the total number of potential buyers (let's say 5,000) times the annual purchase rate percentages for new applications to get a range for annual unit sales into market
- We could use the market share assumptions for the "three major player" market to get a range for target market share. Multiplied by the range for annual unit sales into the market, we now know how much we can expect to sell each year.
- Then, we could project or market entry speed (or "ramp up") using the "existing company, new application area" profile.
- Ultimately, we should be able to chart a range of anticipated market performance.

PROJECT 2: Project Areas of Growth for Vertical Application Software

OBJECTIVE - Determine the markets that are most likely to be successful over the next 5 - 10 years.

POSSIBLE SEGMENTATION

Industry	Functional Segment 1	Functional Segment 2	Functional Segment 3	Functional Segment 4	Functional Segment 5
Aerospace & Defense	Sales & Marketing	Design & Engineering	Manufacturing	Distribution & Logistics	Financial
Fabricated Products	"	"	"	"	"
Electronics & Appliance	"	"	"	"	"
Automotive	"	"	"	"	"
Food/Packaged Goods Manufacturing	"	"	"	"	"
Oil & Gas	"	"	"	"	"
Chemical	"	"	"	"	"
Pharmaceutical	"	"	"	"	"
Metals	"	"	"	"	"
Pulp & Paper	"	"	"	"	"
Textile	"	"	"	"	"
Food Retail	Merchandising	Store Management	Replenishment & Procurement	Distribution & Logistics	Financials
General Retail	"	"	"	"	"
Wholesale Distribution	Sales & Marketing	Distribution Center Management	Replenishment & Procurement	Distribution & Logistics	Financials
State & Local Government					
Education					
Military					
Health Care					
Insurance					
Retail Financial Services					
Banking/S&Ls					
Telecom					
Utilities					
Airlines/Travel					

EXPECTED USE - We would use this information to assist in selection of markets for application software development investment.

MARKET RESEARCH ABSTRACT

Diagonal – • credit card proc

PROJECT 2: ***Project Areas of Growth for Vertical Application Software***

OBJECTIVE - Determine the markets that are most likely to be successful over the next 5 - 10 years.

• Overall part of sector
• Apps: Plug vs non-plug

POSSIBLE SEGMENTATION

Industry	Functional Segment 1	Functional Segment 2	Functional Segment 3	Functional Segment 4	Functional Segment 5
Aerospace & Defense	Sales & Marketing	Design & Engineering	Manufacturing	Distribution & Logistics	Financial
Fabricated Products	"	"	"	"	"
Electronics & Appliance	"	"	"	"	"
Automotive	"	"	"	"	"
Food/Packaged Goods Manufacturing	"	"	"	"	"
Oil & Gas	"	"	"	"	"
Chemical	"	"	"	"	"
Pharmaceutical	"	"	"	"	"
Metals	"	"	"	"	"
Pulp & Paper	"	"	"	"	"
Textile	"	"	"	"	"
Food Retail	Merchandising	Store Management	Replenishment & Procurement	Distribution & Logistics	Financials
General Retail	"	"	"	"	"
Wholesale Distribution	Sales & Marketing	Distribution Center Management	Replenishment & Procurement	Distribution & Logistics	Financials
State & Local Government					
Education					
Military					
Health Care					
Insurance					
Retail Financial Services					
Banking/S&Ls					
Telecom					
Utilities					
Airlines/Travel					

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EXPECTED USE - We would use this information to assist in selection of markets for application software development investment.

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INPUT

Atrium at Glenpointe, 400 Frank W. Burr Blvd., Teaneck, NJ 07666 Tel. (201) 801-0050
Fax (201) 801-0441

June 18, 1992

Mr. Thomas Moldauer
Andersen Consulting
69 West Washington Street
Chicago, IL 60602

Dear Tom:

Attached are INPUT's proposals for (a) Developing a Yardstick to Measure Application Software Opportunities; and, (b) Projecting Areas of Growth for Vertical Application Software.

In the first proposal, INPUT has taken a somewhat different approach in constructing scenarios for yardsticks. This was done for the following reasons:

- We felt increasingly uncomfortable in relying only on case studies, since the selection the relatively few case status could inadvertently influence the conclusions. Equally important, case studies cannot provide weighting factors for guidance on how important the different types of scenarios might be.

- INPUT's approach also has the virtue in that it provides a single model, with room to insert (and test for) a number of variables.

INPUT has not yet published this model, since we are still working on it. We request that you not share this model and analysis with people outside of Andersen since (a) we expect to make further adjustments to it; and, (b) we consider this proprietary material.

It is our understanding that INPUT may be the only firm that will propose a model-based approach combined with a modified case study approach. This may make our proposal more difficult to assess and, consequently, we would like to receive the opportunity to not only answer questions but to supplement this proposal with additional information if required.

The second proposal plays directly off of the work that INPUT has been doing in vertical markets for some time and is straightforward . One issue that we didn't raise in the proposal (although it was implied) is whether some of the industry segments should be collapsed together and others divided more finely.

These proposals are being transmitted by fax. A typed copy, including staff biographies and attachments describing syndicated research, are being sent separately.

I look forward to talking to you and others at Andersen in more detail on these proposals.

Sincerely,

Thomas O'Flaherty
Vice President

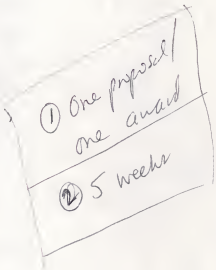
A PROPOSAL

PROJECTING AREAS OF GROWTH FOR VERTICAL APPLICATION SOFTWARE

Yardstick

Submitted to

ANDERSEN CONSULTING



June 18, 1992

Submitted by

INPUT

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201-801-0050
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I. BACKGROUND

Andersen Consulting is looking to perform more quantitative and analytic checks against its applications software investment business cases. Andersen believes that this process would be assisted considerably if there were available profiles or templates of software product "market behavior", including such things as:

- Annual purchase rate profiles, showing the percent that would be expected to purchase a vertical software product. Possible scenarios include:
  - -- Stimulated market (by regulatory changes, technology changes, etc.)
  - -- Normal mission critical
  - -- New applications (where packaged solutions did not exist or where a particular solution is new for an industry)
- Target, steady-state market share for a software product, with two major variables: Several major players, no major player.
- Market entry build-up for an existing company, for a new application area as well as a next generation of a current application.

Andersen has indicated that these scenarios may be modified in developing the approach or in the course of the study. Andersen has indicated that it is open to other models or scenarios, as long as the scenarios above are covered.

The results will be used globally, but analysis covered in this proposal will be largely focussed on the U.S. The analysis should focus on products where a single sale is typically large (i.e., over $100,000) and sold to large companies or divisions of large companies. Either traditional unitary mainframe products or suites of products (e.g., in the client/server environment) would qualify.

Andersen has requested that INPUT prepare this proposal indicating how INPUT would address this set of issues.

II. SCOPE

In the course of this study, the following issues should be addressed and answered:

- Is there a single model (or series or related models) which would describe the life of the typical software product and/or market?
- To the extent that there are different phases in the product life cycle, what factors would affect the "build-up" as opposed to the "steady-state" parts of cycles? How much do purchase rates differ, depending on which part of the cycle a product (or market) is in?
- Besides identifying these factors, what is the relative importance of individual factors, or groups of factors?
- How does the market share potential differ, depending on the state of the software product cycle? What other factors affect this?
- What are the major distinctions in new entry build-up, depending on whether a totally new application or an application "enhancement" for the same prospect set is involved?
- How well do these models track against actual customer behavior in the past? And future intentions?

III. CONDUCT OF THE WORK AND METHODOLOGY

INPUT will explain both the conceptual foundations of its approach as well as how INPUT would actually conduct the work.

A. Concept

Product life cycles are well-known, beginning with introduction and ending with decline. Software is different in several respects:

- Software never "wears out" (although users may often wish that it did)
- More importantly, software products (and software product groups) do not necessarily decline but often renew themselves during periods of "discontinuities". This process is illustrated schematically in Exhibit 1.

Changes in demand can occur because of changes in product characteristics or in the external business or technical environments. An important set of factors is whether these changes are systemic or organization-specific.

- If systemic, then these can give rise to a new product; or, where there is an existing set of products, there may be a discontinuity -- new vendors will be more able to compete and the identity of leading vendors may change.

- Organization-specific changes, on the other hand, are less likely to occur in many organizations simultaneously and would usually be responsible for product change in the less intense steady state.

- Exhibit 2 illustrates the differences that are likely to be causative factors in the build-up and steady-state phases. One of the key issues in the research phase is to place at least approximate weights on these. This would make it easier to classify both markets and product proposals along the cycle continuum.

INPUT believes that new applications and enhanced applications inhabit different parts of the model, as hypothesized in Exhibit 3. Research would confirm/modify and quantify this.

Similarly, INPUT believes that market share scenarios differ, depending on the phase in the software cycle (Exhibit 4). Research would also be needed to confirm/modify and quantify these statements.

INPUT would perform research and analysis to clarify and quantify the conceptual approach described above. INPUT expects that the real-world research will modify or expand some of the details above as well as flesh out the model.

B. Conduct of the Work

INPUT is proposing a study that will have three mutually reinforcing components:

- Interviews with large U.S. companies ($100 million in revenues or equivalent per company or operating unit)

- Tracking of vendor rankings in selected categories over the last ten years.

- Case studies of selected vendors/products

1. Customer Interviews

INPUT will interview 150 U.S. companies on their significant application plans:

- "Significant" = $100,000 plus investment
- This includes software products, in-house development or vendor-developed custom software.
- Enhancements are included where planned and budgeted as a significant item and will not include ongoing maintenance.
- The time scale will be from 1980 (or as far back as is reliably known) to as far in the future as is reliably known)

The purpose will be to develop an application census (divided into major categories) and, most importantly, to identify what the most important reasons were for making changes. The reasons would be developed from the list in Exhibit 2.

When the analysis is completed, the following information will be available:

- Purchase rates for stimulated, normal and new applications.
- Relative importance of the individual factors in, for example, business change vs. regulatory stimulation.
- Differences between horizontal vs. industry-specific applications as a class.
- An assessment as to the importance of individual industries.

INPUT recommends that 150 telephone interviews be conducted, broken out into five industries. INPUT recommends the following industries as being varied and likely to cover a range of experience:

- Retail banking
- Property/casualty insurance
- Discrete manufacturing
- Packaged goods (in process manufacturing)
- State/local government

These markets could be replaced by others by mutual agreement. INPUT believes that a mix and variety of markets are essential.

INPUT would draft the questionnaire for Andersen review and conduct interviews using INPUT staff; Andersen would not be identified as the client in any public research. INPUT would perform the analysis, prepare and present a presentation in overhead transparency format and deliver the presentation in Chicago. After receiving feedback, INPUT would prepare a written report.

2. Track Vendor Shares

To confirm and supplement the interview research, INPUT would track leading vendor shares for a product or product group in each of the five markets listed above

INPUT would use the data for markets and vendors which it has tracked since 1974, supplemented by direct inquiry to vendors and other data. Andersen would not be identified as the client.

These would be correlated with the findings of the interview study and presented at the same time.

3. Case Studies

As a further correlation, INPUT would select, in consultation with Andersen, 5 to 10 products to be analyzed. This analysis would include: Sales/sites, product changes, competitive reaction.

INPUT would use the data for markets and vendors which it has tracked since 1974, supplemented by direct inquiry to vendors and other data. Andersen would not be identified as the client.

These would be correlated with the findings of the interview study and presented at the same time.

4. Summary

Much of this work can be done in parallel (see "Schedule", below).

INPUT believes that this methodology will provide a very strong method of "triangulation" to identify the most important factors that Andersen will be apply to apply to product and market opportunities.

IV. INPUT'S QUALIFICATIONS

INPUT believes that it is uniquely qualified to assist Andersen in this project.

INPUT has been actively tracking software markets and vendors since 1974. Reports and backup is retained for at least ten years for project such as this. Descriptions of the Market Analysis Program and Vendor Analysis Program are attached.

INPUT is very experienced in conducting special studies such as this one. Many of these studies involve original research and analysis to supplement its program information. INPUT conducts over 100 such special studies annually.

Last, and not least, INPUT understands software markets and the software industry. INPUT has consulted to many of the leading software products companies internationally.

The project will be directed by Thomas O'Flaherty, Vice President. He will be assisted by John McGann, Principal Consultant and Joanne Ponnwitz, Associate Consultant. Review and quality control will be provided by Dennis Wayson, Vice President. Their biographies are attached. Other INPUT staff will be drawn on as required.

V. SCHEDULE

Week	Task
1	Meet with Andersen; develop questionnaire
2	Begin interviewing; collect data for market share and case studies
3	Teleconference with Andersen
4	End interviewing
5	Analyze information (from interviews, market share and case studies)
6	Prepare presentation
7	Present results
8	Prepare written report

VI. FEES

INPUT's professional fee for the study will be $37,000.

One-half of INPUT's professional fee for the study is due and payable upon authorization of the study; the remainder at the time of the presentation of results.

Out-of-pocket expenses (telephone, production, and travel) are in addition to the professional fees and will be billed at cost. INPUT does not expect these to exceed 10% of the professional fee (3,700).

INPUT can begin work within two weeks of project authorization. This proposal will remain valid for thirty days, unless extended in writing. Andersen Consulting can initiate the study by providing authorization in the blocks provided below.

AUTHORIZATION

To authorize the project as specified, please sign and return one copy of this proposal, along with the initial fee. Upon acceptance by INPUT, a countersigned copy of the proposal will be returned to Andersen Consulting.

AUTHORIZED BY: **Andersen Consulting**	ACCEPTED BY: **INPUT**
Name	Name
Title	Title
Date	Date

Exhibit 1

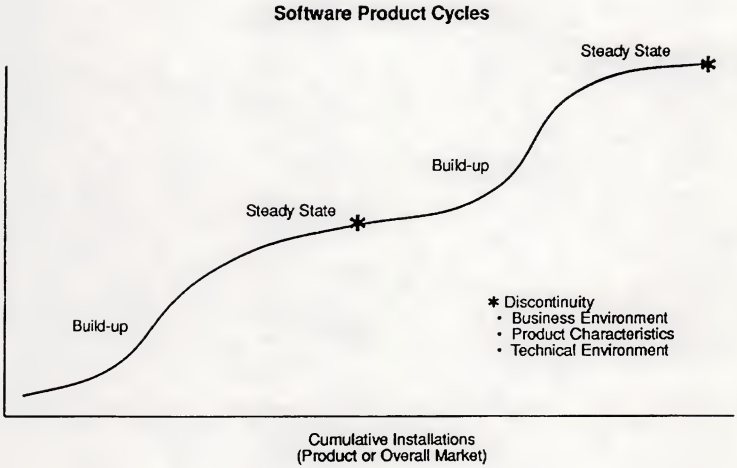

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Exhibit 2

CHANGES AFFECTING SOFTWARE PRODUCT SALES

Changes In:	Phase in Software Cycle: Build-up (Systemic Change)	Phase in Software Cycle: Steady State (Organization-Specific Change)
Business Environment	· Regulations · General Economy	· Corp. Profitability · Reorganization (Acquisition)
Product Characteristics	· Industry Requirements · "Need Creation"	· Corporate Strategy · User Needs · Reaction to Competition
Technical Environment	· New Platforms (HW/SW)	· Platform Conversion

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Exhibit 3

MARKET ENTRY DYNAMICS

	Phase in Software Cycle		
Market Entry Options	Initial Build-up	Steady State	Discontinuity Build-up
New Application	Typical	Rare	Often Occurs
Application Enhancement	Application Spin-off	Incremental Improvements	Next Generation

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Exhibit 4

MARKET SHARE DYNAMICS

Market Share Factors	Phase in Software Cycle: Initial Build-up	Steady State	Discontinuity Build-up
Many Players (No Dominance)	Typical	Rare	New Players Entry
Several Dominant Players	Rare	Typical	New Leaders May Emerge

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CONTACT REPORT

INPUT Staff: Init. TAR Init. CS ☒ INPUT office ☐ Client Office ☐ Other _____

Contact Date: 6.9.92

Date Written: 6.15.

	DISTRIBUTION: Action	Info.	By When	Prog./Proj. ID _____ Describe Action-F/U
Company Andersen Consulting				
Name Tom Moldauer	TAR	CS	6/18	Proposal
Title Dir Prod Planning Appl Prodn		NH		
Address		RDW		
Phone: (312) 507-8743				
Fax: ( ) -				

Met at NJ office. Discussed attached mkt res request

Moldauer background - 12 yrs in Cons & SW
- Own SW co sold to MSA in 1984 (forecasting SW)
- MSA 84-88
- Andersen 1988-

Responsible for working w/ind prod groups in making R&D investment in SW (largely in-house projects)

10-12/yr

No real system or template now for judging

(1) Wants to have a series of outside benchmarks
(2) Wants guidance on best sectors

See att for (1) & (2)

(3) Also, may need due diligence help

Doesn't know a lot about INPUT capabilities on (1) & (3) - should include in proposal

$850k probably too high for #1

☒ Continued over

MARKET RESEARCH ABSTRACT

PROJECT 1: Develop a Yardstick to Measure Application Software Opportunities

OBJECTIVE

Determine "profiles" or ranges of expected market performance for specific product/market scenarios. This research pertains specifically to mission critical, vertical application software solutions with software sales prices in excess of $100,000 sold to buyers with gross revenues of at least $100 million. All analysis must be on a global scale. All findings should be expressed in terms of ranges.

SCENARIOS

Annual Purchase Rate Profiles

Out of the total population of potential buyers, what percent will replace (or buy anew) a specific application each year? Three scenarios should be considered:

- **Stimulated Market** - regulatory changes, significant technology changes, or significant business practice changes prompt major buying activity (e.g., Hospital buying in the U.S. during the mid 80's prompted by DRG Medicare reimbursement schedule)
- **Normal Mission Critical** - mission critical applications, with no major stimulation of market beyond normal, continuous technology advances (e.g., MRP systems)
- **New Application** - a market where packaged solutions have not previously existed, or where vertically focused packages are new for an industry (e.g., process industry manufacturing systems over the last 5 years)

Market Share Profiles

What is a reasonable target market share? Custom and in-house development must be considered competitors. Two scenarios should be considered:

- **Three Major Players** - normal market with several major players
- **Crowded Market** - many players with small market share

Market Entry Profiles

How fast can a new entry build up to target market share? Two scenarios should be considered:

- **Existing Company, New Application Area** - vendor has proven themselves in other applications
- **Existing Company, Next Generation of Current Application** - vendor already markets the application and is superseding the product line

POSSIBLE APPROACHES

- **Large Numbers** - look at a large cross-section of applications over a long period of time to get some ranges for each of these scenarios.
- **Specific Case Studies** - find three specific cases for each scenario (like the DRG example above), dissect what happened, and see if a pattern is there.

EXPECTED USE

We would use these profiles for reasonability checks against software investment business cases.

For a completely hypothetical example, let's say there is a proposal to invest in a Water Rationing application for the Local Municipality market. This is a new, mission critical application. There are other well funded vendors pursuing the same market. The vendor seeking investment has many products, but this is their first venture into this application.

- We could take the total number of potential buyers (let's say 5,000) times the annual purchase rate percentages for new applications to get a range for annual unit sales into market
- We could use the market share assumptions for the "three major player" market to get a range for target market share. Multiplied by the range for annual unit sales into the market, we now know how much we can expect to sell each year.
- Then, we could project or market entry speed (or "ramp up") using the "existing company, new application area" profile.
- Ultimately, we should be able to chart a range of anticipated market performance.

Revised Specifications - Market Research/Consulting Project

Thank you very much for your proposal. I appreciate the thought and effort that went into it. Having had time to consider the various proposals as well as my objectives and timetables, I would like to revise the specifications as follows:

- A selection will be made by July 1.
- A final report must be drafted by July 31.
- The project will be done on a budget of $40,000, including out of pocket expenses.
- The project should address both:
  1) Identification of "best bet" vertical and horizontal markets
  2) Development of a "yardstick" to measure software product opportunities
- To control scope on item 1 above, I would suggest focus on the following industry segments: Manufacturing (all types), Distribution, and Retailing. I will re-emphasize that this piece cannot be a research project. We are looking for your firm's experts to draw upon their knowledge of the market and communicate it to us.
- To control scope on item 2, I would expect a less rigorous "proof", and a conclusion that is expressed in terms of ranges of expected performance.

Please call me to discuss this. I would like to have a revised proposal in hand by Friday, 6/26.

For your information, my reactions to your proposed approach were as follows:

- I feel you understand what we're trying to accomplish. Your response echoed our needs, and offered added value as well as an articulate, respected opinion regarding the approach.
- I agree with and understand the concept of "discontinuities". Given what you suggest, I believe that there can be one model for product life cycle. I believe that you can capture "market entry build up" as part of the life cycle. I do not understand, however, how you expect to address the issue of market share ranges.
- Identification of 20 software opportunities may be overkill. An even dozen would probably suffice for now.
- In addition to what you listed, I would expect to see two other items in the documentation of an opportunity area: 1) assessment of competition, and 2) specific opportunities for differentiation.

Facsimile Cover Sheet

To: Mr. Thomas O'Flaherty
Company: INPUT
Phone: 201.801.0550
Fax: 201.801.0441

From: Tom Moldauer
Company: Andersen Consulting
Phone: 312.507.8743
Fax: 312.507.0510

Date: 6/22/92
Pages including this cover page: 2

Comments:

July 22

To: INPUT Staff

Fm: TOF

Sub: Andersen Consulting (Application Software Products)
Project - YNSWR

We have begun work on some very interesting projects for Andersen, to help them plan their application software product strategy. One aspect of this is to use INPUT's collective antennae to identify new opportunity areas for software products.

The ground rules are

- Customers should be good-sized ($100mm plus)
- A typical sale should be on the order of $100K (Note: in today's client/server environment this need not be for a single package.)
- We are especially interested in what INPUT terms "discontinuities" in the market, i.e., some event that will disturb established products and let new products/vendors enter. See the attached exhibits for illustrations of this.
- We'll be largely looking at the U.S. market, but opportunities originating in the European market are fine.

I invite everyone to make nominations on the attached. Each nomination entitles the originator to bill 1 hour against the project. Especially good nominations will receive a bonus.

Please submit your nominations by Tuesday, July 28.

Thanks.

	Phy 91-92	Tot	%
Food - Lg	9	17	53?
Food - Med	11	16	69
Ut - Lg	4	17	24
Ut Med	11	38	29
Total SW			44
Total - All Miss.		~~38~~	38

SW Phy installed 91-92

1

	75-84	85-87	88-90	91	92	Unk
Lg Food	6	23	29	13	29	0
Med Food	20	10	12	8	40	10
Lg Ut	24	9	31	13	22	0
Med Ut	46	13	15	7	19	0
	24	14	22	10	28	2

2

	Med	1-4	5-9	10-14	15+	Unk	New
Lg Food	10	13	6	13	15	9	44
Med Food	~~19~~	5	15	10	10	5	55
Lg Ut	12	0	16	20	~~13~~	4	47
Med Ut	10	0	3	5	5	12	75
	10	4	10	12	11	8	55

3

	Plg			In-H		
	Fac	N-Fac	Unk	Fac	N-Fac	Unk
Lg Food	48	52	-	23	59	18
Med Food	81	13	6	54	29	17
Lg Ut	28	65	6	79	18	3
Med Ut	61	39	0	48	52	0
	55	42	3	51	40	9

6

	Sw Plg-now				In-H-now			
Prior	Now/ New	Ok	Plg	Sell	Now	Ok	Plg	In-H
Lg Food	41	12	12	35	48	3	3	45
Med Food	38	6	6	50	67	4	4	25
Lg Ut	53	6	35	6	43	7	0	50
Med Ut	79	13	5	3	67	9	5	19
	53	9	15	23	56	7	3	34

7

	Plg	In-H
Lg Food	37	63
Med Food	40	60
Lg Ut	38	62
Med Ut	64	36
	45	55

% of new installed 90-92

65
27
48
20
40

INPUT

Atrium at Glenpointe, 400 Frank W. Burr Blvd., Teaneck, NJ 07666 Tel. (201) 801-0050
Fax (201) 801-0441

June 25, 1992

312 507-8743

Mr. Thomas Moldauer
Andersen Consulting
69 West Washington Street
Chicago, IL 60602

Via Fax

Dear Tom:

Attached are INPUT's integrated proposals for (a) identification of future "best bets" applications software markets, and (b) developing a yardstick to measure application software opportunities.

As we discussed on the telephone, at the presentation of results you will receive 95%+ of the findings and recommendations. The written report would address issues raised at the presentation and make the findings self-contained.

INPUT believes that we could make a significant contribution to Andersen's initiatives in these areas and look forward to working with you.

Sincerely,

Thomas O'Flaherty
Vice President

a:prop:YNGEN70

REVISED PROPOSAL

DEVELOPING A "YARDSTICK" TO MEASURE SOFTWARE PRODUCT OPPORTUINITIES: BACKGROUND, SCOPE AND CONDUCT OF THE WORK

Submitted to

ANDERSEN CONSULTING

June 25, 1992

Submitted by

INPUT

The Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, New Jersey 07666
201-801-0050
Fax: 201-801-0441

Note: This proposal discusses the background, scope and conduct of the work for developing a "yardstick" to measure software product opportunities. The work would be done in conjunction with a parallel study on identifying "best bet" applications software opportunities. A separate proposal on background, scope and conduct of the work has been prepared for that project.

The two projects have a unified schedule and fee quotation, which is submitted separately.

I. BACKGROUND

Andersen Consulting is looking to perform more quantitative and analytic checks against its applications software investment business cases. Andersen believes that this process would be assisted considerably if there were available profiles or templates of software product "market behavior", including such things as:

- Annual purchase rate profiles, showing the percent that would be expected to purchase a vertical software product. Possible scenarios include:
  - -- Stimulated market (by regulatory changes, technology changes, etc.)
  - -- Normal mission critical
  - -- New applications (where packaged solutions did not exist or where a particular solution is new for an industry)
- Target, steady-state market share for a software product, with two major variables: Several major players, no major player.
- Market entry build-up for an existing company, for a new application area as well as a next generation of a current application.

Andersen has indicated that these scenarios may be modified in developing the approach or in the course of the study. Andersen has indicated that it is open to other models or scenarios, as long as the scenarios above are covered.

The results will be used globally, but analysis covered in this proposal will be largely focussed on the U.S. The analysis should focus on products where a single sale is typically large (i.e., over $100,000) and sold to large companies or divisions of large companies. Either traditional unitary mainframe products or suites of products (e.g., in the client/server environment) would qualify.

Andersen has requested that INPUT prepare this proposal indicating how INPUT would address this set of issues.

II. SCOPE

In the course of this study, the following issues should be addressed and answered:

- Is there a single model (or series or related models) which would describe the life of the typical software product and/or market?
- To the extent that there are different phases in the product life cycle, what factors would affect the "build-up" as opposed to the "steady-state" parts of cycles? How much do purchase rates differ, depending on which part of the cycle a product (or market) is in?
- Besides identifying these factors, what is the relative importance of individual factors, or groups of factors?
- How does the market share potential differ, depending on the state of the software product cycle? What other factors affect this?
- What are the major distinctions in new entry build-up, depending on whether a totally new application or an application "enhancement" for the same prospect set is involved?
- How well do these models track against actual customer behavior in the past? And future intentions?

III. CONDUCT OF THE WORK AND METHODOLOGY

INPUT will explain both the conceptual foundations of its approach as well as how INPUT would actually conduct the work.

A. Concept

Product life cycles are well-known, beginning with introduction and ending with decline. Software is different in several respects:

- Software never "wears out" (although users may often wish that it did)
- More importantly, software products (and software product groups) do not necessarily decline but often renew themselves during periods of "discontinuities". This process is illustrated schematically in Exhibit 1.

Changes in demand can occur because of changes in product characteristics or in the external business or technical environments. An important set of factors is whether these changes are systemic or organization-specific.

- If systemic, then these can give rise to a new product; or, where there is an existing set of products, there may be a discontinuity -- new vendors will be more able to compete and the identity of leading vendors may change.

- Organization-specific changes, on the other hand, are less likely to occur in many organizations simultaneously and would usually be responsible for product change in the less intense steady state.

- Exhibit 2 illustrates the differences that are likely to be causative factors in the build-up and steady-state phases. One of the key issues in the research phase is to place at least approximate weights on these. This would make it easier to classify both markets and product proposals along the cycle continuum.

INPUT believes that new applications and enhanced applications inhabit different parts of the model, as hypothesized in Exhibit 3. Research would confirm/modify and quantify this.

Similarly, INPUT believes that target market shares may differ, depending on the phase in the software cycle (Exhibit 4).

- During the initial build-up phase there would often be many players. There may be no clearly dominant products and/or market share leadership could quickly change.

- In the steady-state phase, several dominant products are much more likely to emerge. This dominance can occur due to several factors (often operating simultaneously), including: superior product characteristics, marketing and support, third party relationships, acquisitions, or mistakes on the part of the competition.

- From a competitive standpoint, the most important period is during a period of discontinuity.

  - New vendors and products will be much more acceptable; often welcomed, in spite of (or because of) compatibility issues.

  - Established vendors may not move quickly enough owing to a belief in their product, the perceived need to remain compatible, the apparent satisfaction of the customer base or fear of competing with their own established product.

  - Market needs may not always be clear (or may be changing). Consequently, the rush of new products and changes in market share will be similar to the initial build-up phase, except that the battle will be fought against a backdrop of dominant players. These dominant players may emerge re-invigorated or may share leadership with new products.

Research would also be needed to confirm/modify and quantify these statements, by means of:

- Tracking vendor shares in several market segments over a cycle to note how leadership positions and target shares were affected by discontinuities and competition.
- Examining how individual products/vendors responded to (or accelerated) changes in the competitive environment and the impact on market share.

INPUT would perform research and analysis to clarify and quantify the conceptual approach described above. INPUT expects that the real-world research will modify or expand some of the details above as well as flesh out the model.

B. Conduct of the Work

INPUT is proposing a study that will have three mutually reinforcing components:

- Interviews with large U.S. companies ($100 million in revenues or equivalent per company or operating unit)
- Tracking of vendor rankings in selected categories over the last ten years.
- Case studies of selected vendors/products

1. Customer Interviews

INPUT will interview 60 U.S. companies on their significant application plans:

- "Significant" = $100,000 plus investment
- This includes software products, in-house development or vendor-developed custom software.
- Enhancements are included where planned and budgeted as a significant item and will not include ongoing maintenance.
- The time scale will be from 1980 (or as far back as is reliably known) to as far in the future as is reliably known)

The purpose will be to develop an application census (divided into major categories) and, most importantly, to identify what the most important reasons were for making changes. The reasons would be developed from the list in Exhibit 2.

When the analysis is completed, the following information will be available:

- Purchase rates for stimulated, normal and new applications.
- Relative importance of the individual factors in, for example, business change vs. regulatory stimulation.
- Differences between horizontal vs. industry-specific applications as a class.
- An assessment as to the importance of individual industries.

INPUT recommends that 60 telephone interviews be conducted, divided between two industries. INPUT recommends the following industries :

- Fabricated metal products (in discrete manufacturing)
- Food/packaged goods (in process manufacturing)

Incentive - summary approved by Art

These markets could be replaced by others by mutual agreement.

INPUT would draft the questionnaire for Andersen review and conduct interviews using INPUT staff; Andersen would not be identified as the client in any public research. INPUT would perform the analysis, prepare and present a presentation in overhead transparency format and deliver the presentation in Chicago. After receiving feedback, INPUT would prepare a written report.

2. Track Vendor Shares

To confirm and supplement the interview research, INPUT would track leading vendor shares for a product or product group in each of the markets listed above.

INPUT would use the data for markets and vendors which it has tracked since 1974, supplemented by direct inquiry to vendors and other data. Andersen would not be identified as the client.

These would be correlated with the findings of the interview study and presented at the same time.

3. Case Studies

As a further correlation, INPUT would select, in consultation with Andersen, five products to be analyzed. This analysis would include: Sales/sites, product changes, competitive reaction.

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These would be correlated with the findings of the interview study and presented at the same time.

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INPUT believes that this methodology will provide a very strong method of "triangulation" to identify the most important factors that Andersen will be apply to apply to product and market opportunities.

IV. INPUT'S QUALIFICATIONS

INPUT believes that it is uniquely qualified to assist Andersen in this project.

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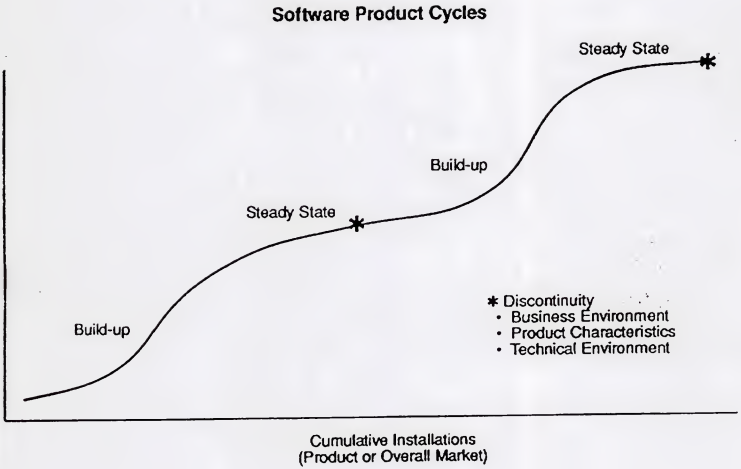
Note: Please see separate pricing and schedule section.

Exhibit 1



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Changes In:	Phase in Software Cycle: Build-up (Systemic Change)	Phase in Software Cycle: Steady State (Organization-Specific Change)
Business Environment	• Regulations • General Economy	• Corp. Profitability • Reorganization (Acquisition)
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Market Entry Options	Phase in Software Cycle: Initial Build-up	Steady State	Discontinuity Build-up
New Application	Typical	Rare	Often Occurs
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Market Share Factors	Phase in Software Cycle: Initial Build-up	Steady State	Discontinuity Build-up
Many Players (No Dominance)	Typical	Rare	New Players Entry
Several Dominant Players	Rare	Typical	New Leaders May Emerge

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REVISED PROPOSAL

IDENTIFICATION OF FUTURE "BEST BET" APPLICATIONS SOFTWARE MARKETS: BACKGROUND, SCOPE AND CONDUCT OF THE WORK

Submitted to

ANDERSEN CONSULTING

June 25, 1992

Submitted by

INPUT

The Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, New Jersey 07666
201-801-0050
Fax: 201-801-0441

Note: This proposal discusses the background, scope and conduct of the work for identifying "best bet" applications software opportunities. The work would be done in conjunction with a parallel study on developing a "yardstick" to measure software product opportunities. A separate proposal on background, scope and conduct of the work has been prepared for that project.

The two projects have a unified schedule and fee quotation, which is submitted separately.

I. BACKGROUND

Andersen Consulting wishes to identify the applications software markets that are most likely to be successful over the next five to ten years.

II. SCOPE

A. Definitions

INPUT has applied the following definitions/working assumptions :

- Size of offering: $100,000 or more generally purchased at one time; no platform or other limitations; tailoring or customizing expenditures not included as a factor.
- Focus is on opportunities for new or significantly enhanced products.
- Segments must meet annual unit sales minimums (approximate); ground rules will be established based on estimated investment and growth parameters.
- The vertical focus will be manufacturing (i.e., ~~aerospace and defense~~, fabricated products, electronics and appliance, ~~automotive~~, food/packaged goods manufacturing, oil and gas, chemical, pharmaceutical, ~~metals~~, pulp and paper, ~~textile~~), wholesale distribution, food retail (essentially supermarkets) and other retail
- "Horizontal" applications (e.g., financial reporting and analysis, geographic information systems, logistics management) will be examined largely within the context of the selected verticals; where other verticals represent an additional opportunity, these will be commented on, but there will not be extensive analysis. (This could be addressed as a later phase.)
- The most emphasis will be placed on segments with market discontinuities (see Exhibit 1 for a summary of potential discontinuities).

- Steady-state applications areas will receive a lower priority even if replacement sales are high; the assumption is that these markets will be much harder to break into, unless Andersen is already established there. → what?

- A preliminary assessment will be made of the competitive environment, but this will not be a determining factor.

- Twelve opportunities will be identified.

- Factors affecting the U.S. market are the most important; however, there should also be a European dimension to the analysis. The impact, if any, in the Japanese market should also be commented on.

B. Issues To Be Addressed

The primary issue is: What are 12 of the leading opportunity areas for software investment?

Subsidiary issues, which should be addressed for each opportunity area, cover the rationale for an opportunity and include some or all of the following:

- How does the software opportunity relate to general business issues and changes affecting the segment? How can an opportunity be differentiated within a segment?

- How closely linked is a particular software opportunity area to other software areas? Some areas, e.g., logistics management, are closely tied to both horizontal and vertical applications (see Exhibit 2 as an example).

- What is the competitive environment?

- In general, how does an opportunity map against the "discontinuity" factors?

III. CONDUCT OF THE WORK AND METHODOLOGY

A. General Approach

INPUT will rely on its ongoing syndicated research (the Market Analysis Program -- material attached for both the U.S. and Europe) to serve as a foundation for this project. However, the bulk of the value-added analysis for this project will come from the collective experience of INPUT's professional staff.

The work will be conducted in two steps, starting with a coarse screen of opportunities, followed by the detailed assessments.

B. Conduct of the Work

INPUT will be briefed by Andersen, either at a meeting or by telephone. INPUT believes that it would be very useful that Andersen indicate new products and product enhancements already committed to. This will greatly assist in deciding where opportunities lie in areas where no near term discontinuities are expected.

INPUT will then prepare a list of candidate opportunity areas (probably 40 or 50). Each candidate area will have a short description including the following:

- Identifying title (e.g., travel management software for businesses)
- A short paragraph describing its functions
- Industry(ies) and, especially, niches covered
- Closely-related applications
- Discontinuities

These will be reviewed with Andersen at an all-day work session at INPUT's New Jersey office. In the course of this work session opportunities may be added or dropped to this list.

INPUT will then conduct a more in depth analysis to identify the critical factors for success. These factors will include:

- An assessment of overall market size and growth, with business-related rationales, especially market discontinuities foreseen.
- An assessment of Andersen's opportunity, given its current position in this or related markets. This will include order of magnitude annualization of unit sales and build-up, where appropriate.
- Customer needs and values
- Competition

INPUT will review these findings with Andersen and then prepare the final assessment on 12 opportunity areas. At this point INPUT expects an opportunity to fall into one of these areas:

- A classic vertical application appealing to a particular industry or, more likely, a niche in an industry.
- A basically horizontal application with some vertical flavor (e.g., financial planning and reporting)
- An application in a new technical setting that creates additional customer value or benefits (e.g., client/server-based branch automation).

INPUT expects that its final work product will consist of its analysis and recommendations for each of the 12 opportunity areas.

INPUT would be available for further detailed research or discussion with Andersen, but this work is not contemplated within this proposal.

IV. QUALIFICATIONS

INPUT is highly qualified to conduct this study.

INPUT's work in vertical and horizontal information services gives INPUT a unique foundation of data and insight (see the material on the Market Analysis Program for both the U.S. and Europe). This will enable INPUT to start quickly and efficiently.

The INPUT staff assigned to this project will bring a great deal of industry and software product experience to the project. The core project team will be from INPUT's New Jersey office and will consist of Thomas O'Flaherty, Vice President, and John McGann, Principal Consultant. In addition, Peter Lines and Roger Fulton from INPUT's European office and Tetsuo Imai of INPUT's Tokyo office will contribute from their geographic perspectives. Peter Cunningham, President, and Dennis Wayson, Vice President, will provide overall review and quality control. Their biographies are attached. Other INPUT staff will be involved in this project as needed.

Note: Please see separate pricing and schedule section.

Exhibit 1

CHANGES AFFECTING SOFTWARE PRODUCT SALES

Changes In:	Phase in Software Cycle: Build-up (Systemic Change)	Phase in Software Cycle: Steady State (Organization-Specific Change)
Business Environment	• Regulations • General Economy	• Corp. Profitability • Reorganization (Acquisition)
Product Characteristics	• Industry Requirements • "Need Creation"	• Corporate Strategy • User Needs • Reaction to Competition
Technical Environment	• New Platforms (HW/SW)	• Platform Conversion

Copyright

BALANCE DUE - "ANDROID" & "BEST BET"	19
TRAVEL	2
~~EQUIP DUE~~	
DESIGN DUE DILIGENCE PROCESS	15
DUE DILIGENCE & TECHNOLOGY RESEARCH REPAYMENT	25

(312) 507-0510

INPUT

Atrium at Glenpointe, 400 Frank W. Burr Blvd., Teaneck, NJ 07666 Tel. (201) 801-0050
Fax (201) 801-0441

August 19, 1992

Mr. Donald A. Chartier
Andersen Consulting
69 West Washington Street
Chicago, IL 60602

Dear Don:

I hope the work session last week was useful for you. I found it stimulating.

As I promised, I looked over some recent studies (all proprietary) that we had done on software products. Attached is some pertinent data from two of them (each with ultimate individual site sales well over $100,000).

- Exhibit A Purchased by functional departments
- Exhibit B Purchased by IS departments, used by IS and end-user analysts

In Exhibit A the "usability" functions (ease of use, ease of learning) are considered very important -- but so are half a dozen other factors. Note that vendors as a group perform quite well; this is a competitive market with several recently introduced products.

The customers in Exhibit B gave products decent, but not spectacular, ratings for usability (in the 3.0 to 3.5 range). However, when asked what the major deficiencies were in the product, usability issues (called "learning curve" here) were volunteered by over a quarter of the customers -- very close to the leading deficiency, a lack of product integration; other deficiencies were more technical in nature. These respondents were IS staff; end users would have doubtlessly rated the usability issues as even more important. (Note: In spite of these deficiencies, the product in Exhibit B is selling at a rate close to $100 million per year.)

I hope this is useful. If you have more questions, please call.

Sincerely,

Thomas O'Flaherty
Vice President

TOF:jb
a:tof: ANDRS-DC

Exhibit A

IMPORTANCE VERSUS VENDOR PERFORMANCE TO USERS

Factor	Importance*	Performance**
Data security	4.7	4.1
Training offered by vendor	4.3	4.2
Ease of use	4.3	3.8
Ease of learning product	4.2	3.6
Feature (a)	4.2	4.1
Vendor reputation	4.2	4.2
Customized analysis facilities	4.0	3.7
Price	4.0	3.8
Consulting/implementation assistance	3.9	4.1
Analysis and modeling functions	3.6	3.6
Reporting facilities	3.4	3.9
Feature (a)	3.4	3.9
Graphics	2.6-2.9	3.2

(a) Specific factor suppressed for reasons of confidentiality

* 1 = low, 5 = high
** 1 = poor, 5 = excellent

Differences of 0.4 or less are not material.

Exhibit B

"X" PRODUCT DEFICIENCIES

Deficiency	% of Current Customers
Integration	29%
"Learning curve"	26%
Multi-user, client/server	11%
Portability	9%
Re-engineering	9%
General immaturity	6%
Other Technical (e.g., object-oriented, modeling, graphics)	23%
None Cited	6%
	100%

Note: Open-ended question; coded

P.01

TRANSACTION REPORT

AUG-18-92 TUE 11:55

DATE	START	RECEIVER	TX TIME	PAGES	NOTE
AUG-18	11:53	14159613367	1'14"	2	OK

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FAX TRANSMITTAL FORM

Date: 8/18

Confidential: Y / N
Urgent: (Y) N

To: Name: Sheila / Renee

Tel./Location:

Co.:

Page: 1 of 2

Fax No:

File: Chron
Contact
Other:

From: TCR

Subject: Expense Backup for YNSUR

Andersen has already been invoiced for the total price of YNSUR (at their request, to make sure that FY92 funds are used). Of the $49,000 quoted, $2,000 was nominally set aside for expenses.

We should submit a breakout of expenses ~~for~~ to support the invoice. A copy is enclosed, showing that we spent more than $2,000. [It would have been simpler just to have in-boarded them.]

Please make sure that Tom Moldauer receives this info by 8/26.

YNSWR Expenses

Travel

NY/Chicago	8/12-13	$ 639.80
NY/Atlanta	7/8-9 (pro-rated)	534.01

Interview expenses (telephone)

66 x $11 — 726

Repeat Production/Supplies — 440

$ 2,339.81

SEPTEMBER 1992

IDENTIFICATION OF FUTURE "BEST BET" APPLICATIONS SOFTWARE MARKETS

and

DEVELOPING A "YARDSTICK" TO MEASURE SOFTWARE PRODUCTION OPPORTUNITIES

Prepared for:

Andersen Consulting

Summary of Work Session Material

Prepared August 13, 1992

INPUT

The Atrium at Glenpointe, 400 Frank W. Burr Boulevard, Teaneck, NJ 07646 201-801-0050

Published by
INPUT
The Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, NJ 07666
U.S.A.

IDENTIFICATION OF FUTURE "BEST BET" APPLICATIONS SOFTWARE MARKETS and DEVELOPING A "YARDSTICK" TO MEASURE SOFTWARE PRODUCTION OPPORTUNITIES

The information provided in this report shall be used only by the employees of and within the current corporate structure of INPUT's clients, and will not be disclosed to any other organization or person including parent, subsidiary, or affiliated organizations without prior written consent of INPUT.

INPUT exercises its best efforts in preparation of the information provided in this report and believes the information contained herein to be accurate. However, INPUT shall have no liability for any loss or expense that may result from incompleteness or inaccuracy of the information provided.

YNSWR 100 1992

Objectives

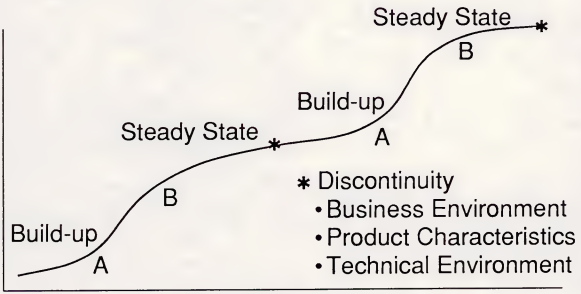
"Yardstick"

- Develop purchase rate profiles
- Develop market share targets
- Understand market entry build-up
- Understand market behavior generally as well as segment variation

"Best Bets"

- Obtain from an informed, independent source assessments of applications software opportunities with a 5-10 year time horizon.

Software Product Cycles



A - New Applications
B - Enhancements

"Yardstick" Research Approach

- Interviews with corporations (IS management): mission critical applications
  - Package versus custom use
  - Age: all, packaged
  - Replacement cycles: historic, changes
  - Importance of new applications
  - Switching: custom to package
  - End user role in selection process
  - Effect of quality initiatives
  - Differential impact of segmentation (industry, customer size)

- Examination of market share change
  - In selected verticals
  - Product group examples

- Product ramp-up rates: vendor experience

67 Companies Were Interviewed

18 Large Food Processors, e.g.,

- Pillsbury
- ConAgra
- M&M Mars
- General Foods
- Sunshine Biscuits

13 Medium Food Processors, e.g.,

- M&M Meat Products
- Zacky Farms
- Singleton Foods
- Gilroy Foods
- Bush Brothers

14 Large Utilities, e.g.,

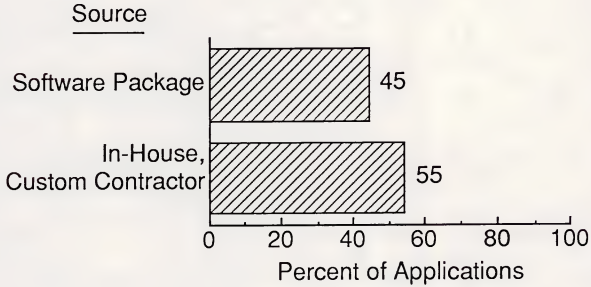
- Northeast Utilities
- Brooklyn Union Gas
- Baltimore Gas & Electric
- Commonwealth Edison
- Southern Company

22 Medium Utilities, e.g.,

- Nebraska Public Power
- Kentucky Power
- Cheroke Electric
- St. Lawrence Gas
- Grand Gulf Nuclear Station

Interviews yielded information on 190 applications.

Almost Half of Mission-Critical Applications Use Software Packages

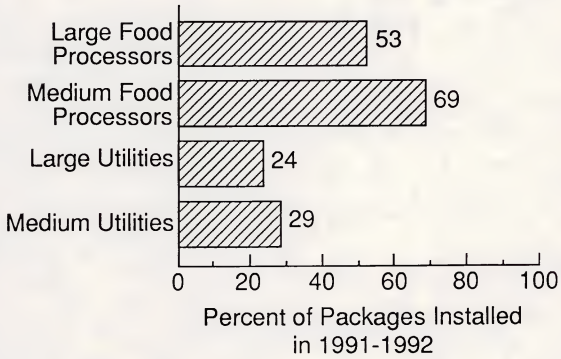


- Exception: Medium-sized utilities are much more likely to have installed packaged software.

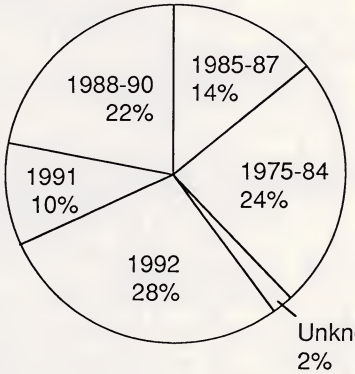
Packages are being installed at a faster rate than custom applications.

- 44% of all packages were installed in 1991-1992.
- 32% of custom applications were installed in 1991-1992.
- Rates vary by industry segment.

Food Processors are Even More Likely to be Installing Packages

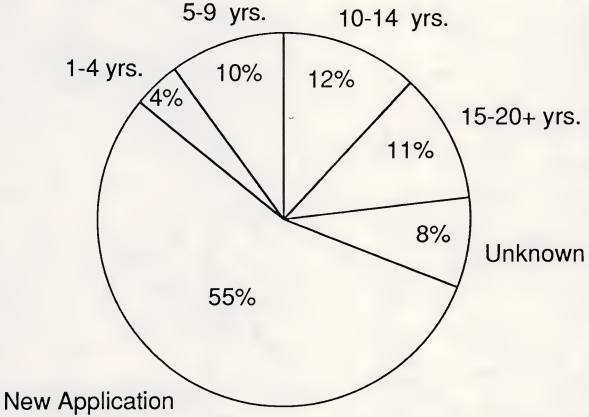


Over One-Third of Mission-Critical Applications Are Less Than Two Years Old



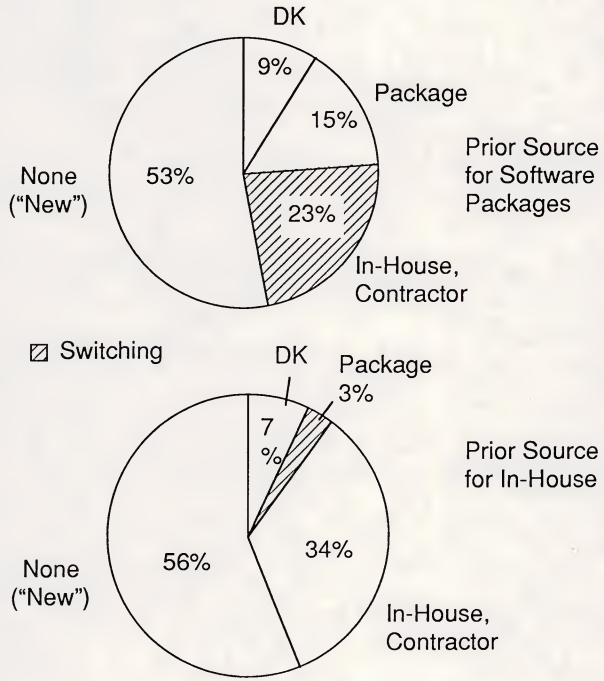
- This indicates an acceleration in the installation of mission-critical applications.
- "1992" includes applications close to completion; this may overstate 1992 figures somewhat by overlapping with 1993.

The Age of Replaced Application Is Less Important than the Preponderance of "New" Applications



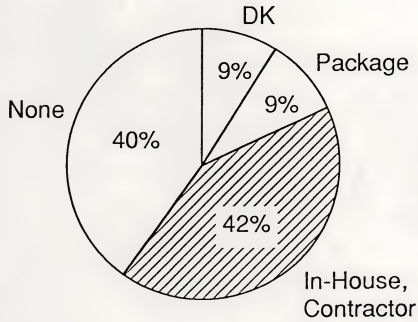
- Median replacement cycle of ten years for existing applications
- But a majority of current mission-critical applications are new, i.e.,
  - Re-engineered business function
  - Automation of manual function (less common in more recent applications)
  - Combining several prior applications (in whole or in part)
  - Application on a new platform which causes significant changes
- 40% of "new" applications were installed since 1990

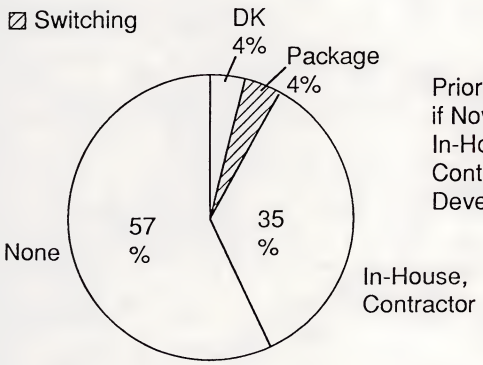
Application "Switching" Is Usually in One Direction



- However, there are significant variations by industry

Switching From Custom To Packaged Software Is Common In The Food Processing Industry





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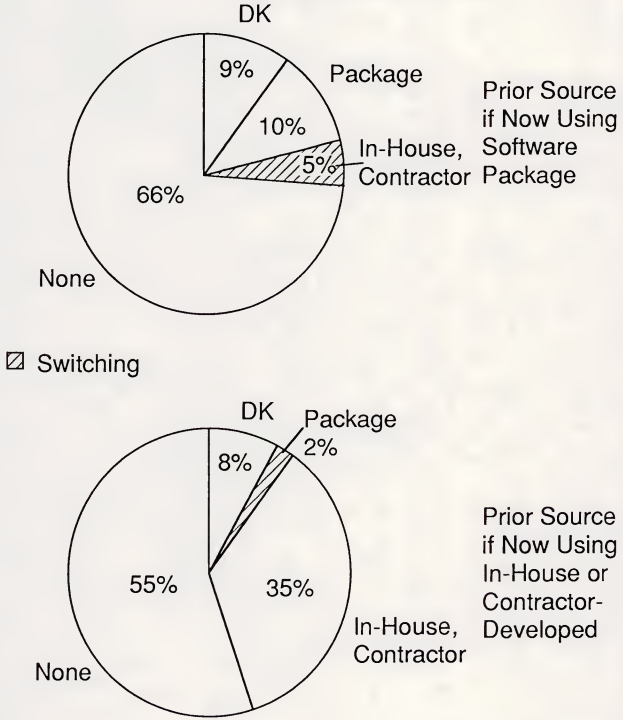
YWNSR

Switching From Custom To Packaged Software Is Uncommon In The Utility Industry



Applications Replacement Rate Factors: Summary

- The historic replacement rate is on a ten year cycle (i.e., 10% a year).
  - But, half of current applications were not replacements, but new.
  - The overall applications installation rate since 1990 is over 25% a year (against the universe of applications).
  - The package installation rate is about 15% a year.
  - These trends should continue.

- Segment variation in replacement/installation rates is significant.
  - Each segment should be assessed separately
  - Segments identified so far include industry and company size
  - Other segmentation factors may include the type of decision maker or a company's competitive position; this type of segmentation is less useful, since companies can not be categorized in advance, based on externally-available information.

Maximum Market Share Expectations

- If no dominant players in an industry segment (typical): 5 - 10 %

- If a dominant player in an industry segment (less common): 30%
  - Product/segment niches remain for other players

Banking: 1987 and 1991 Market Shares

1987			1991	
Rank	Name	Share	Rank	Share
1	IBM	8%	1	5%
2	Unisys	6	3	2
3	NCR	5	2	3
4	SEI	3		*
5	Kirchman	3	6	2
6	Computer Associates	3	10	1
7	CIR	2		*
8	AMS	2	4	2
9	M&I	2	11	1
10	Cullinet	2	a	a
11	CDC	1	b	b
12	Systematics	1	13	1
13	Mellon	1		*
14	FIData	1		*
15	Hogan	1	12	1
16	Stockholder Systems	1		*
17	DEC	1	7	2
18	D&B Software	*	5	2
19	AGS	*	9	2
20	EDS	*	8	2
	SCS Compute	*	14	1
	Logica	*	15	1
	Shared Financial	*	16	1
	Sterling	*	17	1

* = Under 1% a = Acquired by Computer Associates b = Exited

Property/Casualty Software:

Market Shares

1987			1991	
Rank	Name	Share	Rank	Share
1	Policy Management Systems	32%	1	31%
2	Maryland Casualty (a)	7	6	2
3	Redshaw/Delphi (b)	6	2	6
4	Agena	6	3	5
5	Insurelink	5	7	2
6	Insurance Data Processing	4	4	3
7	Heritage	3	8	2
8	EDS	2	9	1
9	ISI	2	5	3

a: Maryland Casualty bought Insurance Systems of America (ISA) P&C insurance business in 1984. It later spun off the agency software business into a new subsidy called Leader Systems (est. revenue $8 million) and sold the original ISA software to Cedar Rapids Software Services (est. software revenue $2 million).

b: Delphi acquired Redshaw and McCracken in 1991.

Applications Software Products Revenue Ramp-Up Record/Assumptions

Vendor	Product	Ramp-Up Period	Comments
Macola Software	Accounting (Client/Server)	1987-1990	$10 million in 1990
PeopleSoft	Human Resources (Client/Server)	1989-1992	Profitable in 1992; success partly based on resemblance to Integral Software product (lawsuit in progress)
SAP (U.S.)	Manufacturing	1988-1990	$15 million (Note: Needed 3 years even with European reputation and many U.S. subsidiaries as customers)

Applications Software Products Revenue Ramp-Up Record/Assumptions (Cont.)

Vendor	Product	Ramp-Up Period	Comments
Computer Associates	Applications generally	Assume 4 year ramp-up to pay off	
Systematics	Banking	Assume 3 years to widespread acceptability	Note: Systematics can guide customers to a greater extent than can many pure software firms

Ramp-Up: "Touch and Feel"

- Critical issue for customers: seeing it work
- The larger the product, the more important is touch and feel
- Faster ramp-up is possible. Contributing factors:
  - Familiarity with similar product
  - Same product on another platform
  - Same product in another geography
  - Joint development with customers
  - Board of advisors (a secondary factor)

"Best Bets": Summary by Industry Groups

Banking

- Personal Banking Manager
- Decemtralized Risk-Assessment System

Insurance

- Property/Casualty Insurance Rating/Quotation
- Property/Casualty Insurance Policy Administration
- Life Insurance Policy Issuance and Administration
- Health Insurance Administration
- Health Benefit Administration/Managed Care

Manufacturing

- Country of Origin Tracking
- Product Management System
- Advanced Logistics
- "Downsized SAP"
- Wait Reduction
- Product Formulation Information System
- Pharmaceutical Research Management and Reporting
- Advanced MRP
- Standard Manufacturing Workstation Interface

"Best Bets": Summary by Industry Groups (Cont.)

Retail

- Logistics for Retail Inventories
- Flexible Couponing
- Retail Grazing
- Restructured Merchandising

Travel

- Corporate Travel Management
- Time-Sensitive Yield Management

Utilities

- Transmission Network Utilization Management
- Nuclear Reactor Management

Cross-industry

- Industry-Specific Accounting
- Sales/Prospect Tracing with GIS Component
- Environmental Management

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CONTACT REPORT

INPUT Staff: Init. TW Init. _____ ☐ INPUT office ☐ Client Office ☐ Other Tel

Contact Date: 9/16/92

Date Written: 9/18/92

	DISTRIBUTION:			Prog./Proj. ID
	Action	Info.	By When	Describe Action-F/U
Company Andersen				
Name Tom Moldauer	TCP	O	9/23	
Title				
Address				
Phone: ( ) -				
Fax: ( ) -				

Wants to take process group - and Pharm & Chem to Food

Said I would get quest. duct by middle of next week

He is still exploring / building support

☐ Continued over

III. BEST BETS

"BEST BET" PARAMETERS

- Customer size: $100 million plus

- Software sale: $100,000 plus
  - Can include multiple copies, as in a client/server environment.
  - Associated professional services and customizing not included.

- A steady state sales rate of $25 million in the U.S. was established as a general cut-off.

- "Discontinuity" factors given special weight.

- Established competition not reason for exclusion, but commented on

- Clustering around industry groups was viewed as positive.

- Certain sectors were rejected (see exhibit).

"BEST BET" IDENTIFICAITON PROCESS

- Brief memo sent to ten senior INPUT staff members providing background and parameters.

- Opportunity profile sheets included.

- Over 50 nominations received; each was discussed and reviewed with nominators.

- Approximately 30 were reviewed with Andersen on July 30.

- Twenty-seven are presented here.

"BEST BET" SECTOR REJECTIONS

Sector	Reason for Rejection
Oil and Gas Exploration	Business decline (medium term)
Construction	Business decline (medium term)
Aerospace and defense industries; government defense	Business decline (long term)
Government (general)	Few packaged opportunities
Transportation companies	Few large buying entities
Professional firms	Few large buying entities

Exhibit (Code)

BEST BETS SCREEN: (Title)

DESCRIPTION

(Text)

INDUSTRY(IES)/NICHES

PURCHASE POINT

(Title)

RELATED APPLICATIONS

DISCONTINUITIES

OTHER FACTORS

(e.g., special opportunities for consulting)

APPROXIMATE MARKET SIZE AFTER TAKEOFF

(Total U.S. market size in millions)

"BEST BETS": OPPORTUNITY INDUSTRY GROUPS

		Number
· Banking	(B)	2
· Insurance	(I)	5
· Manufacturing	(M)	9
· Retail	(R)	4
· Travel	(T)	2
· Utilities	(U)	2
· Cross-industry	(X)	3
TOTAL		27

(Tendy to increase Installation Rate

Other ~~Drivers~~ Factors in ~~Replacement~~

- End user role increasing
- Application replacement/installation expected ~~seen~~ to ~~be~~ increase
- Technology is expected accelerating change

U.S. Systems Integration Market Share—1990

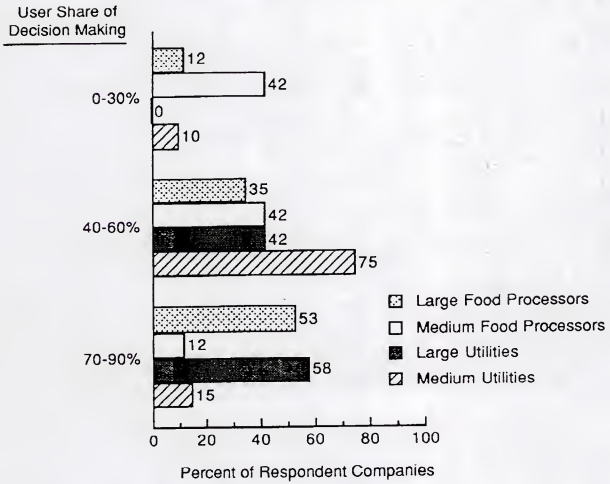
Vendor	Share (Percent)
IBM	17
Andersen Consulting	10
EDS	9
DEC	8

SICO1-JF3- 32

INPUT

F

End-User Decision-Making Authority in Replacing Applications Software



N = 67 companies

- Users have more authority in larger companies

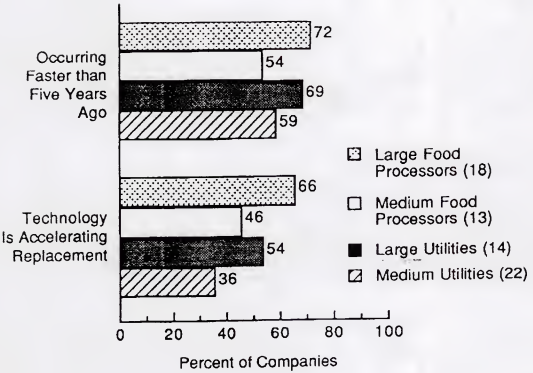
REASONS FOR LARGER FIRMS' USERS BEING MORE ACTIVE

(from other studies)

- Many user departments in large firms have reached critical mass
  - "Mini IS" departments
  - Computer literate
  - Transfers from IS
- Bureaucratic nature inhibits IS-user communications
- Large firms IS departments more likely to be locked into MVS and maintenance

D

Application Replacement



N = 67 companies; number in each group in parentheses

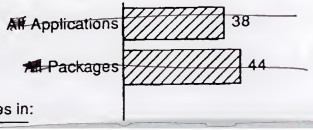
- Increased rate generally repeated; somewhat higher in large companies
- Technology more of an accelerant in larger companies

Packages

B-6

by Food Processors

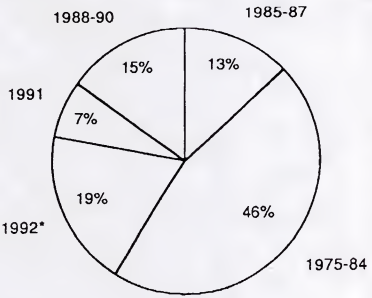
~~Mission-Critical Applications~~ Installed in 1991-1992: Software Packages ~~by Segment~~ are ~~much~~ more likely to be packages



CUSTOMER RESEARCH: MAJOR FINDINGS

- Almost half of current mission-critical applications use software packages.
  - Significant variation by segment
  - About a quarter of packages replaced a custom application
- Over half of mission-critical applications are new. (not a replacement)
- Pure "replacement rate" is on a ten-year cycle (10%)
- Recent installations have been at twice that rate; rate may increase
- Significant variations by segment (industry &/or size)
- User role is significant, and growing
- Quality initiatives have varying effects] omit ?

Year of Installation of Current Mission-Critical Applications (Medium Utilities)



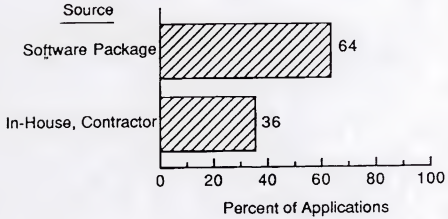
N = 59 applications

*Includes applications close to completion

REASONS FOR CHOOSING CUSTOM SOFTWARE

- Specialized application ("Peanut")
- Application must fit into established environment (technical and/or business process)
- "Couldn't find the package."

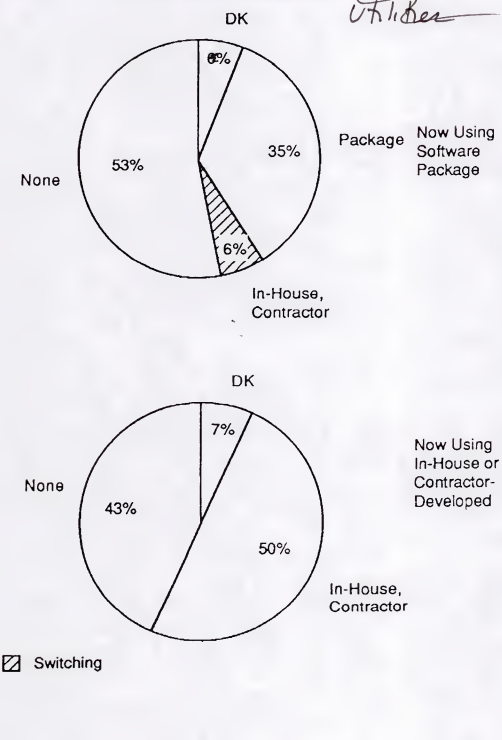
Source of Current Mission-Critical Applications (Medium Utilities)



N = 59 Applications

Switching from custom to packaged software is uncommon in ~~food processors~~ Utilities

Prior Sources of Mission-Critical Applications (Large ~~Food Processors~~ Utilities)



Sent

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Fax (201) 801-0441

FAX TRANSMITTAL FORM

Date: 9/10

Confidential: Y / N
Urgent: Y / N

To: Name: Tom Moldauer

Tel./Location: 8743

Co.: Andersen

Page: 1 of 2

Fax No: 312 507 0570

File: Chron
Contact
Other:

From: Tom O'Flaherty

Subject:

Revised p. 15 (also enclosed w/ hard copy)

Nov 25

Dec 2

AGENDA

I. Introduction

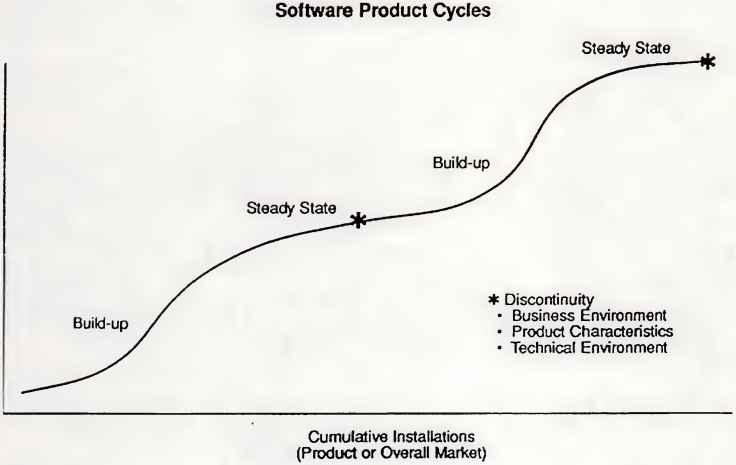
- Study Objectives
- Software cycle hypotheses

II. "Yardstick"

- Customer research findings
- Market share issues
- Application ramp-up

III. "Best Bets"

Exhibit 1



Copyright

Exhibit 2

CHANGES AFFECTING SOFTWARE PRODUCT SALES

Changes In:	Phase in Software Cycle: Build-up (Systemic Change)	Phase in Software Cycle: Steady State (Organization-Specific Change)
Business Environment	· Regulations · General Economy	· Corp. Profitability · Reorganization (Acquisition)
Product Characteristics	· Industry Requirements · "Need Creation"	· Corporate Strategy · User Needs · Reaction to Competition
Technical Environment	· New Platforms (HW/SW)	· Platform Conversion

Copyright

Exhibit 3

MARKET ENTRY DYNAMICS

	Phase in Software Cycle		
Market Entry Options	Initial Build-up	Steady State	Discontinuity Build-up
New Application	Typical	Rare	Often Occurs
Application Enhancement	Application Spin-off	Incremental Improvements	Next Generation

Copyright

Exhibit 4

MARKET SHARE DYNAMICS

Market Share Factors	Phase in Software Cycle: Initial Build-up	Steady State	Discontinuity Build-up
Many Players (No Dominance)	Typical	Rare	New Players Entry
Several Dominant Players	Rare	Typical	New Leaders May Emerge

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MWOC82

MANAGING automation

FREE SUBSCRIPTION ACCEPTANCE MEMORANDUM

TO:

FROM:

RE:

Start my FREE subscription to Managing Automation immediately.
☒ YES ☐ NO

NOTE: All questions must be answered to qualify for a FREE subscription to Managing Automation.

Title VP

Division (if any)

Dept./Mail Stop

Telephone # (201) 801 0050

INPUT

400 Frank Burr Blvd

Teaneck NJ 07666

1 Is your plant automated?
☐ 1. Fully automated ☒ 4. Planning stages
☐ 2. Islands of automation ☐ 5. No plans yet
☐ 3. Work cell level

2 Are you involved in managing this automation process? ☒ Yes ☐ No

3 Are you involved with a task force or planning team on plant automation? ☒ Yes ☐ No

4 Are you directly involved in implementing your company's plant automation? ☒ Yes ☐ No

5 Are you a ☐ 1. Systems Integrator ☐ 2. VAR or ☒ 3. Consultant on automation? (Check one.)

6 How many people work just at your company location?
☐ A. 1,000 or more ☐ C. 100-499 ☐ E. 20-49
☐ B. 500-999 ☐ D. 50-99 ☒ F. under 20

7 How many people are employed in the entire company or corporation (all locations)?
☐ A. 10,000 or more ☐ C. 500-999 ☒ E. 1-99
☐ B. 1,000-9,999 ☐ D. 100-499

8 Primary product manufactured (or service performed).
Consulting

The address above is a ☐ home ☐ business address.

Your title (check one box that applies most)

☒ 01. CORPORATE AND FINANCIAL MANAGEMENT (Includes–Chairman, President, CEO, Owner, Director, CFO, General Manager, Senior/Executive/Group/Financial VP.)
☐ 02. MIS/FACTORY INFORMATION SYSTEMS (Includes–Manager/Director/VP of DP and/or Information Systems.)
☐ 03. PRODUCTION PLANNING AND INVENTORY CONTROL MANAGEMENT (Includes–VP/Manager of Production, Planning, and Purchasing.)
☐ 04. AUTOMATION MANUFACTURING/PRODUCTION MANAGEMENT (Includes–VP, Manager, Chief, Director, Supervisor.)
☐ 05. AUTOMATION MANUFACTURING/PRODUCTION ENGINEERING (Includes–Manufacturing, Production, Process, Quality Control Engineers.)
☐ 06. PLANT/FACILITIES MANAGEMENT (Includes–VP, Manager, Head, Chief, Director, Supervisor of Plant, Factory or Facility.)
☐ 07. PLANT/FACILITIES ENGINEERING (Includes–Plant, Maintenance, Facilities and Works Engineers.)
☐ 08. DESIGN/R&D MANAGEMENT (Includes–VP, Manager, Director, Head, Chief, Supervisor of Design or R&D.)
☐ 09. DESIGN/R&D ENGINEERING (Includes–Design, Research, Product Development, or Specifications Engineers.)
☐ 10. CONSULTANTS (Includes–Consultant and Educational Titles.)
☐ 11. OTHER (Please specify.)

Please check below the products and/or services that you help acquire, recommend, specify or select.
(Check all that apply.)

COMPUTERS
01 ☐ Barcode Scanners & Printers/Automatic ID
02 ☐ Computer Mainframes
03 ☐ Computer - Mid-range (Minis)
04 ☒ Computers PC
05 ☒ Data Acquisition Systems
06 ☒ Engineering & Industrial Workstations
07 ☐ LANS & Data Communication Systems

CONTROLS
08 ☐ Machining & Turning Centers NC/CNC/DNC
09 ☐ Motion Control/Servo Systems
10 ☐ PLC, NC, CNC, DNC Controls
11 ☐ Process Controls/ Monitoring

MACHINE TOOL & MATERIAL HANDLING SYSTEMS
12 ☐ AGVS
13 ☐ Automated Assembly Systems
14 ☒ Automated Measuring Equipment
15 ☐ Automated Storage & Retrieval Systems
16 ☐ FMS (Flexible Manufacturing Systems)
17 ☐ Machine Vision Systems
18 ☐ Robots
19 ☐ Sensors

SOFTWARE
20 ☒ CAD Software
21 ☒ CAE Software
22 ☒ CAM Software
23 ☒ Inventory Control Software
24 ☒ MRP II Integrated Software
25 ☒ Prod. Planning Software
26 ☒ Quality Control Software
27 ☒ Relational DBMS Software
28 ☒ Simulation Software

OTHER
29 ☒ System Integrator/ Consultants
30 ☐ None of the above.

Signature

Date 6/28/92

Please sign here to qualify.

I. INTRODUCTION

SOFTWARE CYCLE HYPOTHESES

- Repeated build-ups and steady states
- Systemic versus organization-specific drivers
- Market entry
- Market share

CHANGES AFFECTING SOFTWARE PRODUCT SALES

Changes In:	Phase in Software Cycle: Build-up (Systemic Change)	Phase in Software Cycle: Steady State (Organization-Specific Change)
Business Environment	• Regulations • General Economy	• Corp. Profitability • Reorganization (Acquisition)
Product Characteristics	• Industry Requirements • "Need Creation"	• Corporate Strategy • User Needs • Reaction to Competition
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Several Dominant Players	Rare	Typical	New Leaders May Emerge

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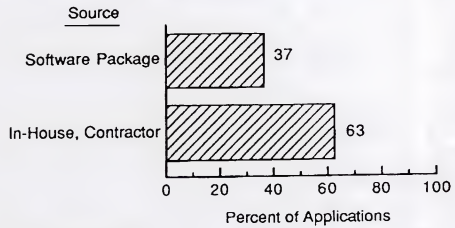
II. YARDSTICK

INDUSTRY RESEARCH

Industry	Large	Medium	TOTAL
Food Processors	18	13	31
Utilities	14	22	36
TOTAL	32	35	67

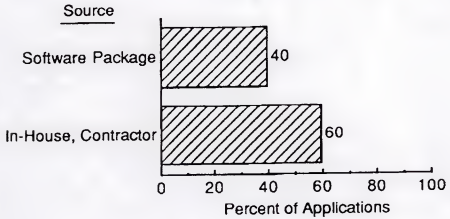
- IS Management interviewed
- 190 Applications areas described

Source of Current Mission-Critical Applications (Large Food Processors)



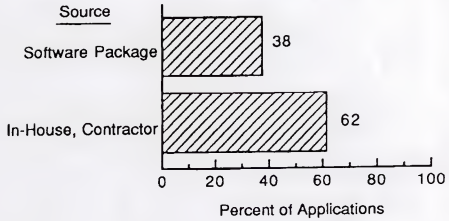
N = 46 Applications

Source of Current Mission-Critical Applications (Medium Food Processors)



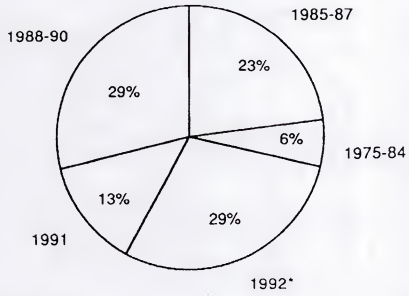
N = 40 Applications

Source of Current Mission-Critical Applications (Large Utilities)



N = 45 Applications

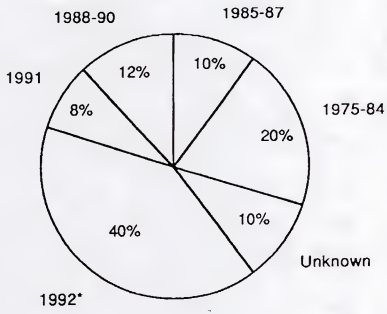
Year of Installation of Current Mission-Critical Applications (Large Food Processors)



N = 46 applications

*Includes applications close to completion

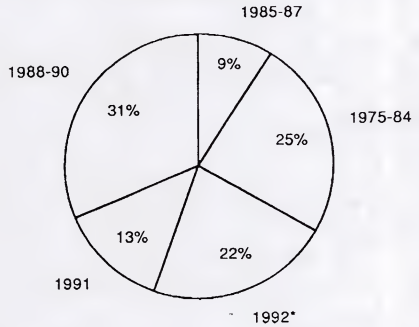
Year of Installation of Current Mission-Critical Applications (Medium Food Processors)



N = 40 applications

*Includes applications close to completion

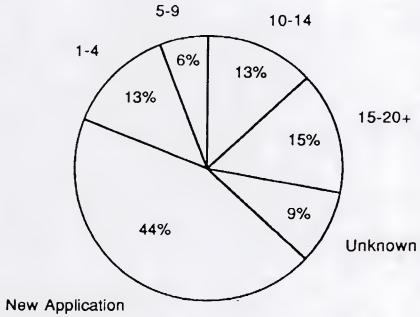
Year of Installation of Current Mission-Critical Applications (Large Utilities)



N = 45 applications

*Includes applications close to completion

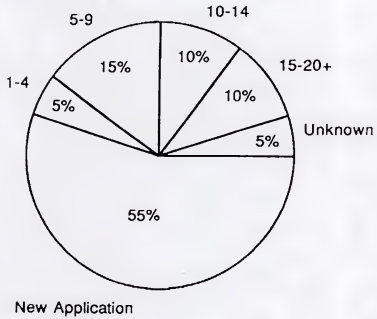
Mission-Critical Applications' Age in Years at Time of Replacement (Large Food Processors)



N = 46 applications
Median = 10 years

- 65% of new applications were installed since 1990

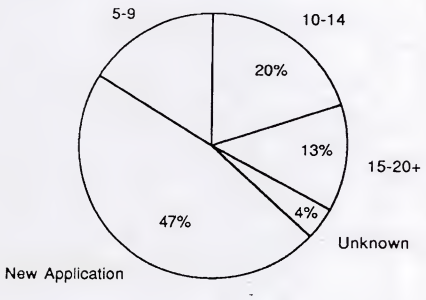
Mission-Critical Applications' Age in Years at Time of Replacement (Medium Food Processors)



N = 40 applications
Median = 9 years

- 27% of new applications were installed since 1990

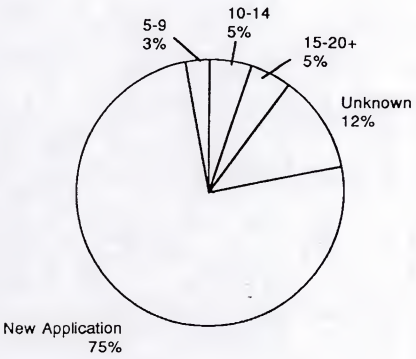
Mission-Critical Applications' Age in Years at Time of Replacement (Large Utilities)



N = 45 applications
Median = 12 years

- 48% of new applications were installed since 1990

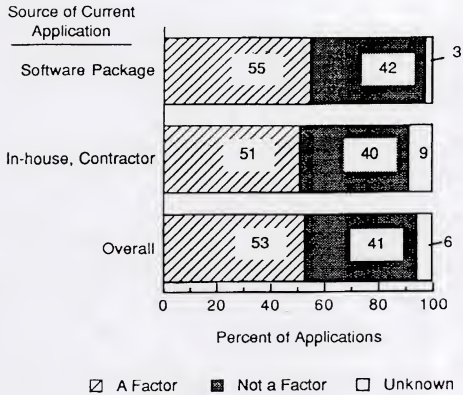
Mission-Critical Applications' Age In Years at Time of Replacement (Medium Utilities)



N = 59 applications
Median = 10 years

- Large proportion of "new" related to higher than average very old applications
- 20% of new applications were installed since 1990

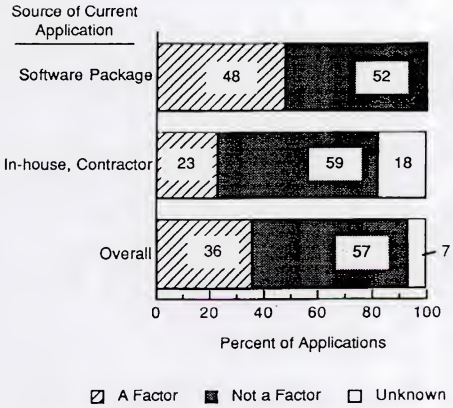
Role of a Quality Initiative in Selecting Current Mission-Critical Applications



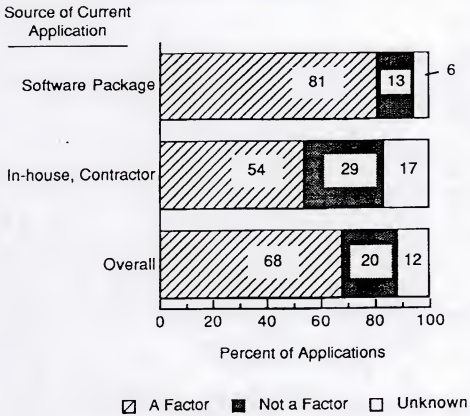
N = 190 applications

- Averages cancel striking differences between larger and smaller firms in motivations to use packages

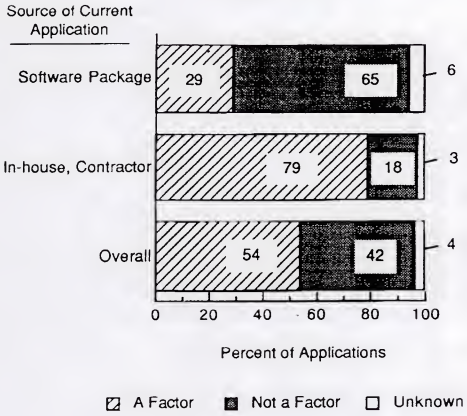
Role of a Quality Initiative in Selecting Current Mission-Critical Applications (Large Food Processors)



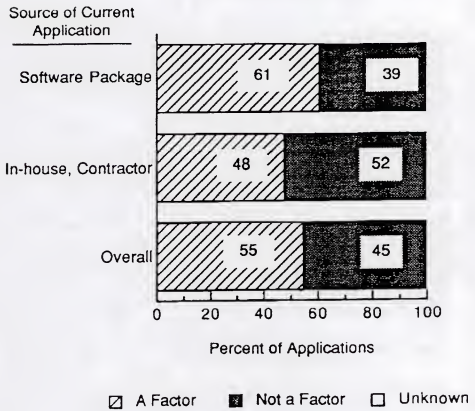
Role of a Quality Initiative in Selecting Current Mission-Critical Applications (Medium Food Processors)



Role of a Quality Initiative in Selecting Current Mission-Critical Applications (Large Utilities)



Role of a Quality Initiative in Selecting Current Mission-Critical Applications (Medium Utilities)



MARKET SHARE ISSUES

BANKING SOFTWARE MARKET SHARE ISSUES

- The banking software market appeared to be heading toward concentration in the early and mid-1980s as vendors brought out comprehensive banking systems (UCCEL, Cullinet, IBM/Hogan). However, these comprehensive systems gained remarkably little headway. Most players are niche players now.

- There are several reasons for this:

  - Users became more important as banks decentralized. User departments wished to maximize the effectiveness of their individual departments. In many banking environments, comprehensive plans that had been previously agreed to became impossible to execute.

  - Associated with this was the loss of power and budgets of IS departments, who had often been the primary supports of the comprehensive approach.

  - The actual products themselves, while comprehensive, weren't comprehensive enough. The larger banks often found that the products did not offer enough options or were not flexible.

  - A vicious circle arose, where the customers began to question the vendors' commitment and orders slowed down. These were contributory reasons for UCCEL and Cullinet being sold to CA (and important reasons for CA slowing investment significantly.)

- Outsourcers (IBM, EDS, Systematics) have proved to be an alternative to packaged comprehensive systems so far in the 1990s. It is not yet clear if outsourcers can be effective in a client/server environment.

- The banking market is going through a further evolution of this change where client/server architectures are seen as being more suitable to department-oriented systems.

ANALYSIS OF COMPUTER ASSOCIATES BANKING SOFTWARE

- CA entered the banking applications software business in 1987 when it acquired UCCEL, primarily for UCCEL's systems software. CA acquired Cullinet in 1989, again, primarily for its systems software business, but gaining a key player in the banking software business. (Earlier in the 1980s Cullinet had determined that growth lay in using its IDMS database product as the foundation for different applications products.)

- UCCEL and Cullinet together had had a 5% share of the market, a share surpassed only by the historic banking products of three systems companies (IBM, Unisys and NCR). By 1991, however, this share had shrunk to 1%. Why?

  - The products were incompatible. Cullinet's may have had more promise, since Cullinet had only recently finished a two year development effort to update its own acquired software. However, Cullinet's required additional investment to match UCCEL's features; CA decided to support current customers, but not to actively market the Cullinet product.

  - The UCCEL product was somewhat older and needed investment also, which was not always forthcoming.

- The CA sales force knew how to sell systems software but not applications software. CA was not able to maintain an effective dedicated sales force.

  - Most importantly, the market was not responding as well to very large comprehensive products. Instead, as banks decentralized and IS departments lost their clout, it was increasingly difficult to find prospects.

- CA has essentially gone into the harvest (maintenance) phase in its banking products.

PROPERTY/CASUALTY SOFTWARE MARKET SHARE ISSUES

- P&C software market has been highly concentrated for over ten years.

- PMS is only vendor which now offers a comprehensive P&C system; other players are niche players, mainly in providing applications linking insurers and agents.

- PMS is the only significant survivor of at least eight vendors offering similar mainframe-based systems into the early 1980s

- Reasons for consolidation:
  - No significant technical platform changes through the 1980s
  - Perceived need for comprehensive system
  - PMS pricing strategy locked customers into expensive maintenance contracts; competitors priced too low to support ongoing improvements.
  - Coming out of the insurance industry, PMS was somewhat closer to understanding market needs.

ANALYSIS OF THE PMS P&C INSURANCE SOFTWARE POSITION

- PMS had already established itself as the leader in revenues by 1980, although not yet in number of installations.
  - The PMS strategy was always to obtain large ($500,000 to $2 million) initial contracts on seven year licenses with obligatory maintenance.
  - This gave PMS the funds necessary to expand its product in the course of the 1980s into all P&C areas.
  - By approximately 1988, PMS had over 75% penetration of companies who were large enough to afford their package and were not committed to custom systems.
  - Several insurance companies with equally comprehensive applications tried to market their systems in the mid-1980s, but by then most potential customers were already locked into PMS.

- In the mid-1980s PMS recognized that growth was limited in supplying software products to P&C companies. Up to that time, virtually all of its revenues came from software products or initial installation charges. Since then PMS has diversified into supplying professional services and supplying data base information for the P&C industry and related businesses. Less than a quarter of PMS' revenue now comes from software licenses (as opposed to maintenance) and much of this comes from prior year sales, due to the nature of their business practices.

- The PMS product is excellent in its own way, but is very complex and inflexible. It represents many of the weaknesses of the traditional mainframe way of doing business, even with a sound product.

- IBM took a minority position in PMS in 1989. One of the results of this has been a joint PMS-IBM effort to develop a new generation of distributed applications. There has already been about $50 million invested in this project. Results are not yet evident. It is not clear if the correct technology choices were made at the beginning of the new development process. PMS customers have been locked into PMS up to now and their satisfaction is mixed.

APPLICATION RAMP-UP

OBJECTIVES

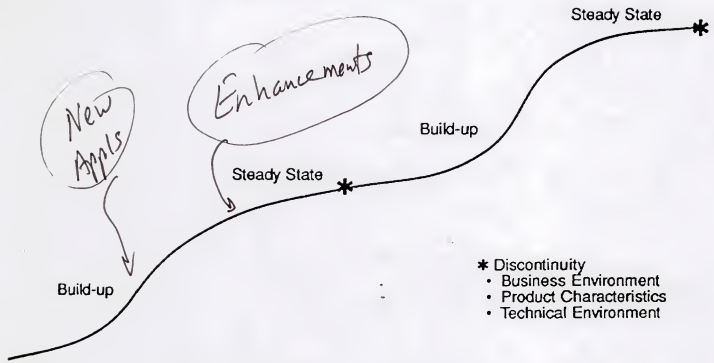
"Yardstick"

- Develop purchase rate profiles
- Develop market share targets
- Understand market entry build-up
- Understand market behavior generally as well as segment variation

"Best Bets"

- Obtain from an informed, independent source assessments of applications software opportunities with a 5-10 year time horizon.

Software Product Cycles



Cumulative Installations
(Product or Overall Market)

"YARDSTICK" RESEARCH

(IS management)

- Interviews with corporations: mission critical applications
  - Package versus custom use
  - Age: all, packaged
  - Replacement cycles: historic, changes
  - Importance of new applications
  - Switching: custom to package
  - End user role in selection process
  - Effect of quality initiatives
  - Differential impact of segmentation (industry, customer size)

- Examination of market share change
  - In selected verticals
  - Product group examples

- Product ramp-up rates: vendor experience

EXAMPLES OF COMPANIES INTERVIEWED

18 **LARGE FOOD PROCESSORS**

- Pillsbury
- ConAgra
- M&M Mars
- General Foods
- Sunshine Biscuits

13 **MEDIUM FOOD PROCESSORS**

- M&M Meat Products
- Zacky Farms
- Singleton Foods
- Gilroy Foods
- Bush Brothers

14 **LARGE UTILITIES**

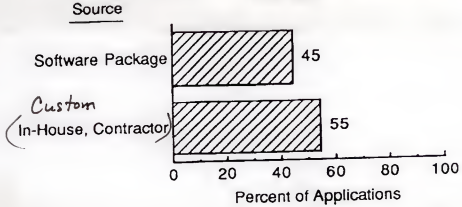
- Northeast Utilities
- Brooklyn Union Gas
- Baltimore Gas & Electric
- Commonwealth Edison
- Southern Company

22 **MEDIUM UTILITIES**

- Nebraska Public Power
- Kentucky Power
- Cheroke Electric
- St. Lawrence Gas
- Grand Gulf Nuclear Station

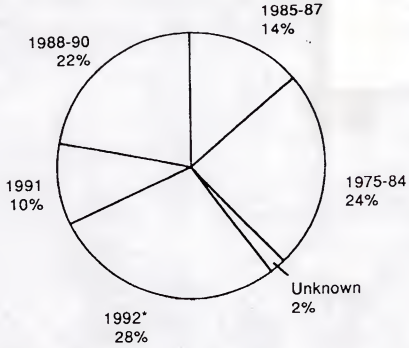
A-1

ALMOST HALF OF MISSION-CRITICAL APPLICATIONS USE SOFTWARE PACKAGES



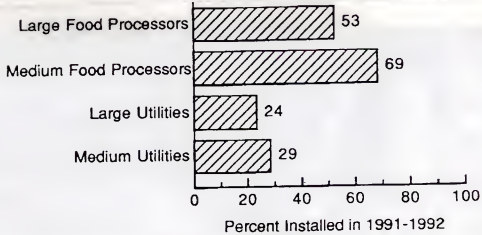
- Exception: Medium-sized utilities are much more likely to have installed packaged software.

OVER ONE-THIRD OF MISSION-CRITICAL APPLICATIONS ARE LESS THAN TWO YEARS OLD



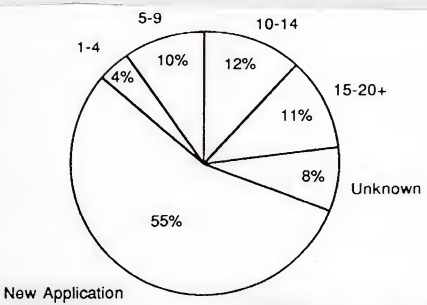
N = 190 applications

- Includes applications close to completion; may overstate 1992 figures somewhat
- Packages are being installed at a faster rate that custom applications
  - -- 44% of all packages were installed in 1991-92
  - -- 32% of custom were installed in 1991-92
  - -- Food processors are even more likely to be installing packages



THE AGE OF REPLACED APPLICATIONS IS LESS IMPORTANT THAN THE PREPONDERANCE OF "NEW" APPLICATIONS

C-1



Age in Years at Time of Replacement

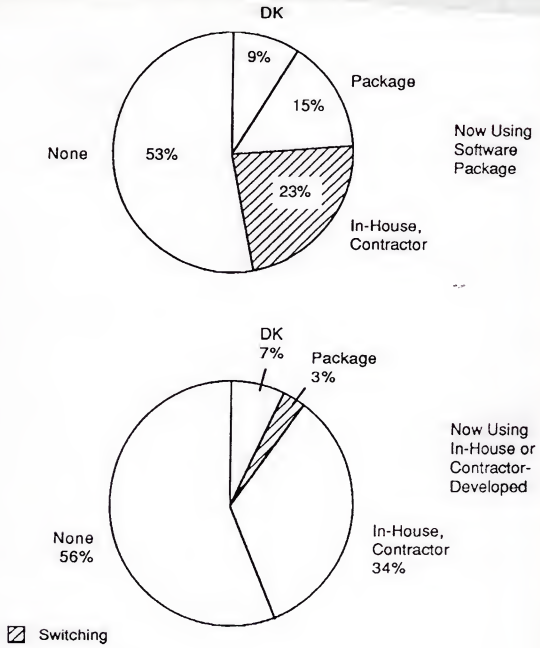
N = 190 applications

- Ten year replacement cycle (median)
- A "new application" can be one of following:
  - -- Re-engineered business function
  - -- Automation of manual function (less common in more recent applications)
  - -- Combining several prior applications (in whole or in part)
  - -- Application on a new platform which causes significant changes
- 40% of "new" applications were installed since 1990

APPLICATION "SWITCHING" IS USUALLY IN ONE DIRECTION

E-1

Prior Sources of Mission-Critical Applications



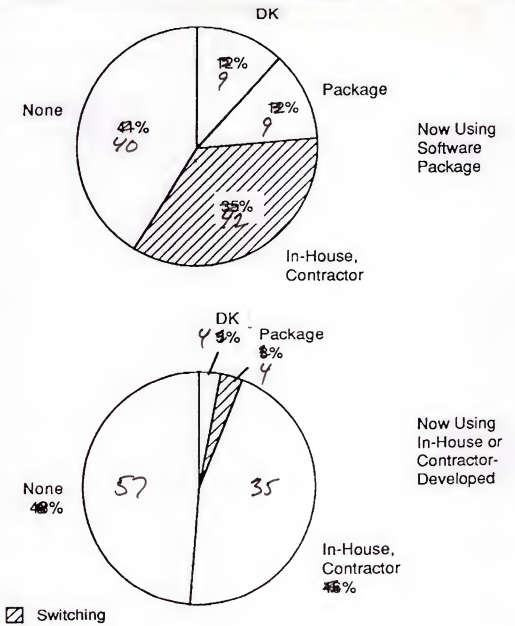
N = 190 applications

- Significant differences between food processors and utilities

SWITCHING FROM CUSTOM TO PACKAGED SOFTWARE IS COMMON IN THE FOOD PROCESSING INDUSTRY

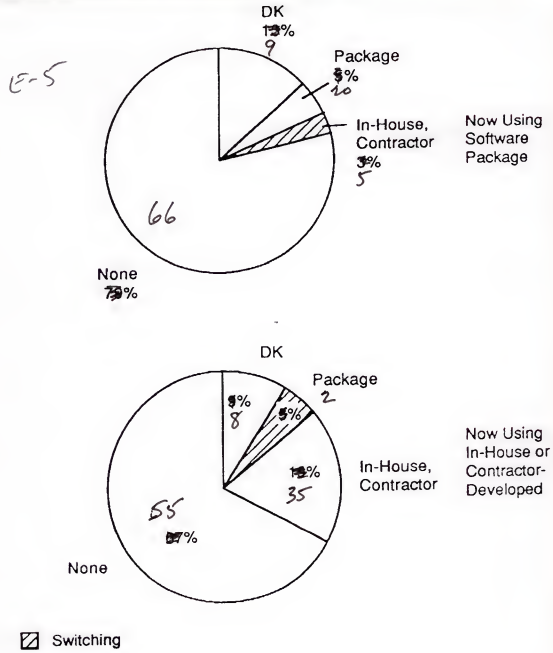
Prior Sources of Mission-Critical Applications

E-2



SWITCHING FROM CUSTOM TO PACKAGED SOFTWARE IS UNCOMMON IN THE UTILITY INDUSTRY

Prior Sources of Mission-Critical Applications



YNS\

APPLICATIONS REPLACEMENT RATE FACTORS

- The historic replacement rate is on a ten year cycle
  - -- But, half of new applications are not replacements, but new
- The recent applications installation rate has been running at more than twice the "replacement" rate (i.e., at least 25%)
- Packages now account for about 60% of new installations, or a package installation rate of about 15%.
- Segment variation in replacement/installation rates is significant.
  - -- Each segment should be assessed separately
  - -- Segments identified so far include industry and company size
  - -- Other segments may include such factors as decision maker or competitive position; this type of segmentation is less useful, since companies cannot be categorized in advance based on externally-available information.

MAXIMUM MARKET SHARE EXPECTATIONS

- If no dominant players (typical): 5-10%
- If a dominant player (less common): 30%
  - -- Product/segment niches remain for other players

BANKING: 1987 AND 1991 MARKET SHARES

		1987	1991	
Rank	Name	Share	Rank	Share
1	IBM	8%	1	5%
2	Unisys	6	3	2
3	NCR	5	2	3
4	SEI	3		*
5	Kirchman	3	6	2
6	Computer Associates	3	10	1
7	CIR	2		*
8	AMS	2	4	2
9	M&I	2	11	1
10	Cullinet	2	a	a
11	CDC	1	b	b
12	Systematics	1	13	1
13	Mellon	1		*
14	FIData	1		*
15	Hogan	1	12	1
16	Stockholder Systems	1		*
17	DEC	1	7	2
18	D&B Software	*	5	2
19	AGS	*	9	2
20	EDS	*	8	2
	SCS Compute	*	14	1
	Logica	*	15	1
	Shared Financial	*	16	1
	Sterling	*	17	1

* = Under 1% a = Acquired by Computer Associates b = Exited

PROPERTY/CASUALTY SOFTWARE: MARKET SHARES

	1987		1991	
Rank	Name	Share	Rank	Share
1	Policy Management Systems	32%	1	31%
2	Maryland Casualty (a)	7	6	2
3	Redshaw/Delphi (b)	6	2	6
4	Agena	6	3	5
5	Insurelink	5	7	2
6	Insurance Data Processing	4	4	3
7	Heritage	3	8	2
8	EDS	2	9	1
9	ISI	2	5	3

a: Maryland Casualty bought Insurance Systems of America (ISA) P&C insurance business in 1984. It later spun off the agency software business into a new subsidy called Leader Systems (est. revenue $8 million) and sold the original ISA software to Cedar Rapids Software Services (est. software revenue $2 million).

b: Delphi acquired Redshaw and McCracken in 1991.

Applications Software Products
Revenue Ramp-Up Record/Assumptions

Vendor	Product	Ramp-Up Period	Comments
Macola Software	Accounting (Client/Server)	1987-1990	$10 million in 1990
PeopleSoft	Human Resources (Client/Server)	1989-1992	Profitable in 1992; success partly based on resemblance to Integral Software product (lawsuit in progress)
SAP (U.S.)	Manufacturing	1988-1990	$15 million (Note: Needed 3 years even with European reputation and many U.S. subsidiaries as customers)
Computer Associates	Applications generally	Assume 4 year ramp-up to pay off	
Systematics	Banking	Assume 3 years to widespread acceptability	Note: Systematics can guide customers to a greater extent than can many pure software firms

RAMP-UP: "TOUCH AND FEEL"

- Critical issue: seeing it work
- The larger the product, the more import the issue
- Faster ramp-up:
  - Familiarity with similar product
  - Same product on another platform
  - Same product in another geography
  - Joint development with customers
  - Board of advisors (secondary)

INPUT®

Atrium at Glenpointe, 400 Frank W. Burr Blvd., Teaneck, NJ 07666 (201) 801-0050
Fax (201) 801-0441

FAX TRANSMITTAL FORM

Date: 9/25

Confidential: Y / N
Urgent: Y / N

To: Name: Tom Moldauer
Tel./Location: 312-507-8743
Co.: Andersen Consulting
Fax No: 312-507-0510

Page: 1 of 5

File: Chron
Contact
Other:

From: Tom O'Flaherty

Subject:

We will be preparing the "thank you" to respondents of the mission-critical application survey.

Attached is a draft which provides interesting information to the outside world without releasing information that is important to Andersen.

Do you agree?

VA	Change		End User		Split		Tech Appl			Tech Speed		
	Faster	Other	More	Other	User 2	other	Y	N	Other	Y	N	Other
31	X		X		80				Some		X	but Sig
32	X		X		70			X		X		
33		No	X		70				DK		X	
34	X		X		90		X					proc speed
35	X		X		50		X			X		
36	X		X		80		X			X		
37	X		X			DK	X			X		
38	X		X		50		X			X		
39		N	X		80		X			X		
40	X		X		50		X					hope
41		N		Some	50		X			X		
42		N	X	not much	60		X				X	
43	X		X		80		X					depends
	3/13		11/13		70% 8/12 40-60 5 10-30 0		10/13			7/13		
50		Some	X		80			X			X	
51		slower	X		80		X			X		
52	X		X		50		X			X		
53		N slow		Some	50			X				maybe
54		N		Some	50		X			X		
55	X		X		50		X				X	bus off
56	X		X		60		X			X		
57	X		X		50				Some			somethings
58		N	X		60		X					DK
59		N	X		50				GV			maybe
60	X			Some	-	Split cash			Some	X		
61		N		Some	60		X				X	
62	X		X		50		X			-		could
63	X		X		80		X			R		
64		Slower	X		40			X				DK
65	X		X		50		X			R		
66	X		X		50		X					Some
67	X			DK	50		X					Think so
68	X		X		30			X			X	
69	X		X		-		X				X	
70	X		X		50			X		X		
71		N	X		0			X			X	
	13/22		17/22		70% 3/20 15 40-60 15 75 0-30 2 10		15/22			8/22		

32 I I P/P 4 x x

2 1 4 1 1 1 2 1 4 0 3 16

4 | 4 | 8 | 4 | 5 | 3 | 16 |

10% 20% 10% 12% 8 40 N= 40

1 4 1 10 16 40

Phy 4 2 1 4 1 1 2 1 2 6 24 60

In-H/C

DK

Prior

Phy

In-H

None

DK

Med Food 40 appl

DK	1970 1 2 3 4 5 6 7 8 9	1980 1 2 3 4 5 6 7 8 9	70 1 2 3 4 5 6 7 8 9	Ruby	Maint Y N	Qual Y N
20			P			
21	no gas N					
22	N					
22	N					
23						
23						
24	N					
24						
25	N					
25	N					
26	N					
26						
27	N					
28	N					
29	N					
29	N					
30	N					
30	N					
31						
31	N					

rewrite?

Med Food

Qual Inst

Control

Current Source	Yes	No	DK	Total
~~Phys~~ Phy	13 8 81	2 13	1 6	16
~~Phy~~ In-H	13 54	7 29	4 17	24
Total	26 65	9 23	5 12	40
	26		3	

Control →

Med Food

Tab ~~for~~ Summary - Age of Appl

1	✓		
2		2	5%
3			
4			
5			
6			
7	~~IIII~~		
8			
9	✓	6	15%
10	✓✓✓		
11			
12	✓		
13		4	10%
14			
15	✓✓✓	~~7~~ ~~5~~ 4	10%
16			
17			
18			
19			
20			
20+	✓		

1990
91 1
92 = 1111 } 6 = 27%

New 22 55%

Unk 2 5%

40

Med Eval

Source of Care

Prior Source	Phy	In-H, Contract	Total
Phy	1 / 6	1 / 4	2
In-H, Contract	10 / 8 / 8 / 50	6 / 25	14
None	8 / 68 / 6 / 38	16 / 67	22
DK	1 / 6	1 / 4	2
Total	16	24	40

Lg Food	DK 1970	1	2	3	4	5	6	7	8	9	1980	1	2	3	4	5	6	7	8	9	1990	1	2	3	4	5	6	DK	Cost	Rate	Maint Y	Maint N	Qual Y	Qual N
1																														4				
2																														4				
3																														4				
4																														5				
5																														DK				
6																														4.5				
7																														3.5				
8																														3				
9																														4				
9																														4				
10																														4				
11																														4				
11																														4				
12																														5				
13																														4				
14																														4				
15																														4				
15																														5				

7 16	N						I			–	X	
16	N						I		10yr	–	X	
		I			I				8yr	5	X	
	N					I			8yr	5	X	
7 17	N							P	–	–		
?	N			I						4		X
?			P*				P			3		X
7 18	N						P			5		X

by Food

Age of Replaced #2

Worksheet - Ly Food dried

1	I	2
2	II	4
3		
4	III	6
5		
6		
7	II	4
8	I	2
9		
10	III	6
11	I	2
12		
13	II	4
14		
15	I	2
16	I	2
17	II	4
18	I	2
19		
20+	II	4
	22	

DK	4
New	21
	47

~~46~~ 47

9

44

1-18 by Fuad

~~Date of~~ Current Application – Year Installed

Date of Prior	75	76	77	78-79	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Total		
DK														1		1111		4		8%
1970										1		1			1			6 1/3	21	6
1971																		0		
1972										1			1					2 1/2	15	4
1973																	1	1	19	2
1974																	1	1	18	2
1975							1									1	1	4/13		6
1976													1					1	12	2
1977													1		1			2 1/2	12	4
1978																		0		
1979																		0		
1980																		0		
1981											1						1	1 1/2	7	4
1982																1	1	1 1/2	9	4
1983																				
1984																				
1985											1						1	8/2	4	4
1986																				
1987														11	11			10/4	2	8
1988																				
1989																				
1990																				
None	1		1						1	111	11		1	XIII	1	111111		21		44
Total	1		1		1				3	5	3	3	4	7	6	14		48		
%	2		2		2				6	11	6	6	8	15	13	29				

Was the Replacement ~~System~~ Part of A Quality Initiative? (Large Food Processor)

Replacement (Some)	Yes (QI?)	No	DK	Total
~~Package~~ In-House/ Contractor	14 ~~30%~~	15 ~~33%~~	0 0	29 ~~63%~~
Package	~~4 9%~~	10 ~~22%~~	3 ~~6%~~	17 ~~37%~~
Total	~~39%~~ 18	~~55%~~ 25	6% 3	~~100%~~ 46

46 Mission Critical Applications (Large Food Processors)

Year Installed	%
1975-84	6%
1985-87	23%
1988-90	29%
1991	13%
1992*	29%
	100%

* Includes application close to completion

Age of Application Replaced	%
Unknown	9%
15-20+ years	15%
10-14 years	13%
5-9 years	6%
1-4 years	13%
Subtotal	56%
New Application	44%
	100%

Median age: 10 years

Ly Food

From	TO: Pkg		In-house/Contractor		Total	
DK	2	12%	1	3	3	7%
Pkg	2	12%	1	3	3	7
In-House/Contractor	6	35%	13	45%	19	41%
None	7	41%	14	48%	21	46%
Total	17	37%	29	63%	46	100%

1-18 Lg Food

89+ = 71% 89+ = 63%

Current Appl-Year Installed	Source of Current: Pkg	Source of Current: In-house	Source of Current: Contractor	Satisfaction: 1	Satisfaction: 2	Satisfaction: 3	Satisfaction: 4	Satisfaction: 5	Quality Init: Y	Quality Init: N	Dk
1975		1		4 (28)	1	3	4	5	4	4	
1976						3	4	1	4	4	
1977						9	4	55	4	4	0
1978									30	33	
1979		#	%								
1980		1	3	17		9	1	25	9	22	6
1981											
1982		1	3								
1983											
1984	#	%									
1985	2	12	3								
1986	2	12	10								
1987	1	6	7								
1988			7								
1989	2	12	7								
1990	1	6	17								
1991	5	29	7								
1992	4	24	34								
	17		29						39	55	6

Pkg In-H/Cont

~~In-H/Cont~~

Pkg 17

46

Prior Source	Pkg	In-house	Contractor
Dk	11	1	
Pkg	11	1	
In-house	1		
Contractor			
None	11		

Lg Food

20 new

1990 11
91 1111
92 ~~1111~~ 11 13/20

65%

(2nd)	Rate of Change		End User		Split		Tech Speed		
	Faster	Other	More	Less	User 2	Other	Tech = Appl	Y	Other
1	X		X		40		NO business	X	
2	X		X		20	but lead	Y	Y	
3	X			same	90		Y	Y	
4	X		X		90		Y user use	X	
5	X	sw easier to use		-	50		Y in 2yrs	X	
6		Fast before		same	50		N business		Not mod
7	X			same	75		-		No
8		No	X		80		N	(X)	
9	X		X			More involved	Y	X	CAD
10	X			same	70		Y	X	
11	X			same	90		Y	Y	
12		DK		same	50		N		N
13		N		same	60		-	(Y)	
14	Y		X		80		N user		N
15	Y		X		95		Y	Y	
16	Y		X		70		Y	Y	
17	Y		X		30		Y		N
18		N		same	50		Y		N
	13/18		more 9/17		10-30 2/17 12 40-60 6/17 35				
			same 8/17		70+ 9/17 53		11/18	12/18	
20	X		X		50		Y	Y	
21		N	X		75		Y		N
22		N		None	10		N		N
23	X		X	upper hand ⇐	30		Y	Y	
24	X			same	60		-	Y	
25	X	cost drive	X		-		Y		Maybe
26	X		X		75		Y	Y	
27	X		X		30		Y	Y	
28	X		X		50		-		Maybe
29		no change		N	20		Y	Y	
30		N		More ed	30		Y		maybe
31	X		X		40		Y		N
32	X		X		60		Y		maybe
					10-30 5 42 40-60 5 42				
	9/13		9/13		70+ 2/12 18		10/13	6/13	

66 N I 5 x

67 N P 5 x
N P 5 x
N P 5 x
67 N P* 5 x

68 P✓ P 5 x
N P 5 x
N P 1 x
68 N 1 x

~~68~~ 69 N P I 3 x
N P✓ 4 x
69 I✓ P P 5 x
5 x

70 N P P 5 x
N P 5 x
N 5 x
71 N P 5 x
N P 5 x
N P 5 x
N 3 x
72 N P* 3 x
N I 1 x
⊗ I 1 x
⊡ P

1 1 5 1 2 1 1 1 3 1 1 3 2 4 | 1 1 6 | 4 5 | 4 | 11

24 27 46 | 8 13 | 9 15 | 4 7 | 11 19 N° 59

Phy 3 1 2 2 2 3 1 5 3 5 4 7 38 64%

In-H 1 1 2 1 2 1 1 1 1 1 1 1 1 1 1 4 21 36%

Med Ut

Med Utilities 59 Appl

	DK	1970	1	2	3	4	5	6	7	8	9	1980	1	2	3	4	5	6	7	8	9	1990	1	2	3	4	5	6	7	8	9	DK	Rating	Maint Y N	Qual Y N
50	N																																5	X	X
51	N																																5	X	X
52	N																																5	X	X
53	N																																5	X	X
54	N																																5	X	X
55	N																																5	X	X
56	N																																5	X	X
57	N																																5	X	X
58	N																																5	X	X
59	N																																5	X	X
60	N																																5	X	X
60	N																																3	X	X
61																																	5	X	X
62	N																																5	X	X
62	N																																5	X	X
63	N																																5	X	X
64	N																																5	X	X
65	N																																5	X	X
66	N																																5	X	X

no answer

Med Ut

Qual Inst

Control

Current Source	Yes	No	Dk	Total
~~In-H/C~~ Phy	23 61	15 39		38
~~Phy~~ In-H	10 48	11 52		21
Total				59
	33 (56)	26 (44)	0	~~59~~

Control →

Med Ut

Source of Care

Prior Source	Phy	In-H, Contract	Total
Phy	2	1	3
In-H, Contract	1	4	5
None	30	14	44
DK	5	2	7
Total	38	21	59

Med Utilization

Tab ~~for~~ Summary - Age of Appl

1			
2		0	
3			
4			
5	✓		
6			
7		2	3
8			
9	✓		
10	✓✓✓		
11		3	5
12			
13			
14			
15			
16	✓✓	2	3
17		3	5
18			
19			
20			
20+	✓		

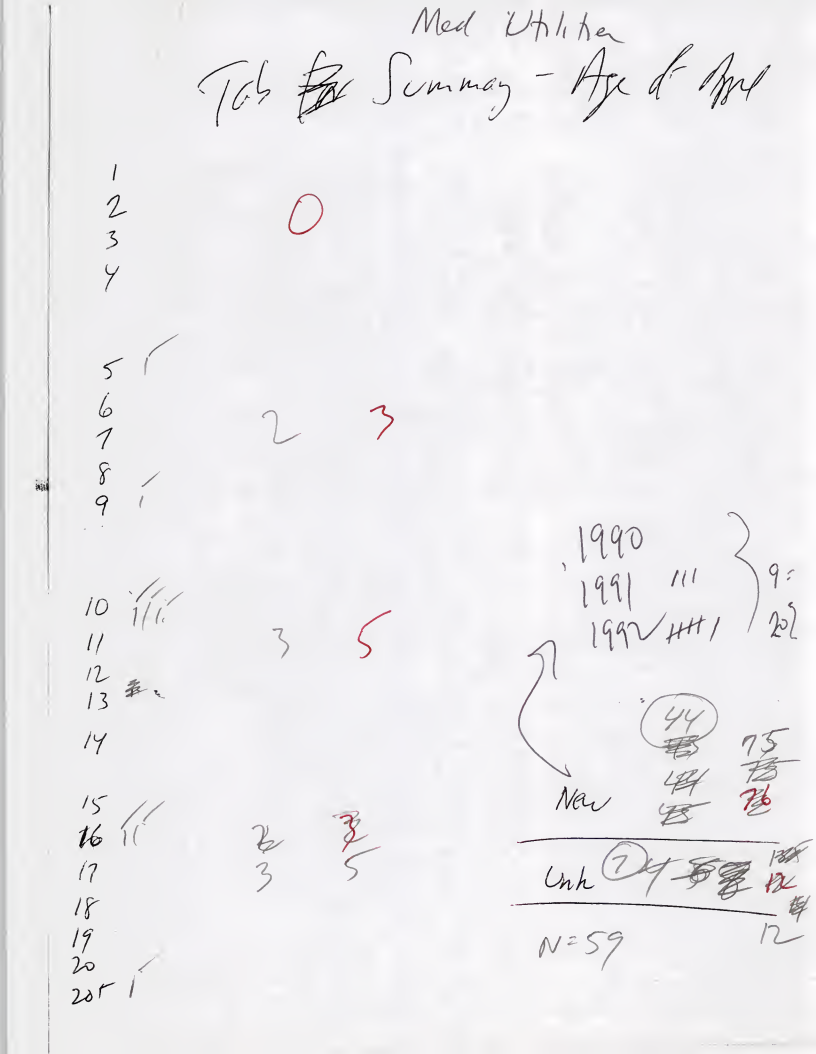
1990
1991 III
1992 ~~IIII~~ I

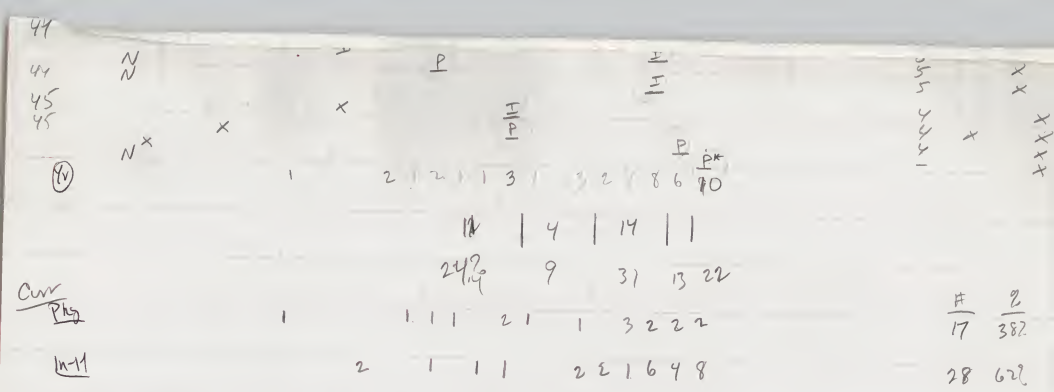
9:
20

New 44 ~~75~~ ~~75~~ ~~76~~

Unk 7 4 ~~5~~ ~~12~~ ~~12~~

N=59 12





44

44 N N P I I

45 45 x x I P

N x

(Yv) 1 2 1 2 1 1 3 1 3 2 1 8 6 P P* 10

11 | 4 | 14 | |

24% 9 31 13 22

Curr

Phy 1 1 1 1 2 1 1 3 2 2 2 # 17 % 38%

In-11 2 1 1 1 2 2 1 6 4 8 28 62%

Lg Uhliter

Lg Utilitie

15 ~~39~~ 45

	DK	1970	1980	1990	DK	Rating	Maint Y	Maint N	Qual Y	Qual N
~~#20~~ 31		I		C		–	–		x	
		?I		I		4	"		x	
32	x	I	I	I	x	5			x	
	N		I			5			x	
	N		I		10yr	5			x	
33	I				10yr	5			x	
			I	I		4			x	
	I		I	P		4	x			x
34	N		P		x	3				x
	N				x	4				x
	N		P	P	x	3				x
35			I			4				x
				I		5			x	
36	N			I		4				x
37	N			C	x	5			–	–
	N		P		P	2	x		x	
37				C	x	4				x
			P		P	5			x	
38			I		I	5			x	
			I		I	5			x	
			I		I	5			x	
39			I		x	5			x	
	~~N~~		I	I		5			x	
					10yr	5			x	
40	N			P		5yr	5		x	
		I		I		10yr	5		x	
	N			P		8yr	5		x	
40	N			I	x	5			x	
41	N					5			x	
41	N			I		10yr	5		x	
	N			I		5yr	5		x	
	N			I		5yr	5		x	
	N			I		7	5		x	
42			P	P		5				x
	N	P			x	4			–	–
		P	P			4				x
				P	x	5				x
						5yr	5			x
43		I		I		4				x
	N			P		2				x

Tab ~~For~~ Summary - Age of Appl

Lg Ltd

1			
2			
3			
4		0	
5	11		
6	1		
7	11		
8	11		
9		7	16%
10	1		
11	1		
12	~~1111~~		
13	1		
14	1	9	20%
15			
16	1		
17			
18	1		
19			
20	11		
20+	~~3~~ 11	6	13%

1990	1111	10
1991	1111	
1992	11	48%

New	21	47%
Unk	~~9~~ 2	4

N = 45

Source of Care

Prior Source	Phy (Control)	In-H, Contract	Total
Phy	6 35	0	6
In-H, Contract	1 1 6	14 50	15
None	9 53	43	21
Dk	1 1 6	2 7	3
Total	~~62~~ 17	~~38~~ 28	45

Qual Inst

Lg Until

Control

Current Source	Yes	No	Dk	Total
~~In-H/C~~ Phg	5 29	11 65	6	17
~~Phg~~ In-H	22 79	5 18	3	28
Total				
	27 60%	16 36%	2 4%	45

Control →